DOCUMENTS EXPEDITING PROJECT

[COMMITTEE PRINT]

SURVEY OF CERTAIN ASPECTS OF THE BALLISTIC MISSILE PROGRAM OF THE DEPARTMENT OF THE AIR FORCE

AS DEVELOPED BY THE

SUBCOMMITTEE ON MANPOWER UTILIZATION

OF THE

COMMITTEE ON POST OFFICE AND CIVIL SERVICE HOUSE OF REPRESENTATIVES

AND BY THE

COMPTROLLER GENERAL OF THE UNITED STATES

DECEMBER 30, 1960

UNITED STATES
GOVERNMENT PRINTING OFFICE
62340 WASHINGTON : 1960

COMMITTEE ON POST OFFICE AND CIVIL SERVICE

TOM MURRAY, Tennessee, *Chairman*

JAMES H. MORRISON, Louisiana
JAMES C. DAVIS, Georgia
JOHN LESINSKI, Michigan
CHET HOLIFIELD, California
KATHRYN E. GRANAHAN, Pennsylvania
CHARLES O. PORTER, Oregon
RALPH J. SCOTT, North Carolina
THADDEUS J. DULSKI, New York
STANLEY A. PROKOP, Pennsylvania
JOHN R. FOLEY, Maryland
DONALD J. IRWIN, Connecticut
RANDALL S. HARMON, Indiana
DALE ALFORD, Arkansas
JAMES C. OLIVER, Maine
JACOB H. GILBERT, New York

EDWARD H. REES, Kansas
ROBERT J. CORBETT, Pennsylvania
H. R. GROSS, Iowa
JOEL T. BROYHILL, Virginia
AUGUST E. JOHANSEN, Michigan
GLENN CUNNINGHAM, Nebraska
GEORGE M. WALLHAUSER, New Jersey
ROBERT R. BARRY, New York
KATHARINE ST. GEORGE, New York

SUBCOMMITTEE ON MANPOWER UTILIZATION

JAMES C. DAVIS, Georgia, *Chairman*

CHET HOLIFIELD, California
RALPH J. SCOTT, North Carolina
THADDEUS J. DULSKI, New York
DALE ALFORD, Arkansas

ROBERT J. CORBETT, Pennsylvania
H. R. GROSS, Iowa
AUGUST E. JOHANSEN, Michigan

EX OFFICIO

TOM MURRAY, Tennessee

EDWARD H. REES, Kansas

CONTENTS

	Page
Letter of submittal	V
Foreword	VII
Comptroller General reports	1
Followup:	
(*a*) Letter of June 7, 1960, to Secretary of Defense from Chairman James C. Davis	51
(*b*) Letter of July 15, 1960, to Secretary of Defense from Chairman James C. Davis	52
(*c*) Letter of August 18, 1960, to Chairman James C. Davis from Secretary of the Air Force	53
Appendix:	
(*a*) Letter of February 10, 1959, to Comptroller General from Chairman James C. Davis	58
(*b*) Letter of May 19, 1960, to Chairman James C. Davis from Comptroller General	59

LETTER OF SUBMITTAL

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MANPOWER UTILIZATION
OF THE COMMITTEE ON POST OFFICE AND CIVIL SERVICE,
December 30, 1960.

Hon. TOM MURRAY,
Chairman, Committee on Post Office and Civil Service,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: The Subcommittee on Manpower Utilization, under House Resolution 78, has been conducting a study of the effects of Government contracting practices on the utilization of Federal manpower and on the performance of management and administrative functions which normally constitute part of the basic duties of the various Government departments and agencies in carrying out their missions.

This subcommittee on April 21, 1959, issued a "Preliminary Report on the Aspects of the Missile Program in the Departments of the Navy and the Air Force" containing preliminary information and data developed by the subcommittee in its earlier consideration of Government contracting practices as they relate to manpower utilization.

This inquiry was undertaken principally because of the effect on manpower utilization of the growing practice of some departments and agencies to contract out their administrative responsibilities and, secondly, because of the apparent duplication and ineffective use of manpower in such important areas as the missile program. Our preliminary report brought out several issues, which we thought wise to ask the Comptroller General of the United States to develop further.

The subcommittee has received two General Accounting Office reports dated October 21, 1959, and May 19, 1960, respectively, dealing with specific questions raised in our reports. Also, a copy of a report to the Congress, covering a "Review of Administrative Management of the Ballistic Missile Program of the Department of the Air Force," has been furnished the subcommittee.

These reports point up a number of significant items relating to the missile program in the Air Force, including (*a*) the reluctance of the Air Force to develop its own resources to manage completely the ballistic missile program; (*b*) the reliance by Air Force on a cost-plus-fee contractor in a most vital role in this program; (*c*) high costs of the present arrangement; (*d*) exceptional individual profits arising from various contractual arrangements; and (*e*) failure by the Government to take title to valuable patents.

The foregoing matters are of such serious import that the subcommittee deemed it necessary to bring them to the attention of the Secretary of Defense and to ask what is being done about them. The

reply from the Department of Defense, by the Secretary of the Air Force, which appears in this report beginning on page 53, sets forth the position of the Air Force and reveals the addition of still another outside manager for Air Force's ballistic missile program, the Aerospace Corp.

The subcommittee, therefore, is making available in one publication the information furnished the subcommittee in the two General Accounting Office reports of October 21, 1959, and May 19, 1960, as well as followup actions to date by the subcommittee in this area. We believe this information, together with the Comptroller General's report to the Congress, also dated May 19, 1960, on "Review of Administrative Management of the Ballistic Missile Program of the Department of the Air Force," will be of interest and concern to members of the full committee, to the Congress, and to officials of the executive branch who are charged with responsibility for successful administration of the missile programs.

With kindest regards, I am,

Sincerely yours,

JAMES C. DAVIS,
Chairman, Subcommittee on Manpower Utilization,
House Committee on Post Office and Civil Service.

FOREWORD

For some time the Manpower Utilization Subcommittee has been concerned about the apparent less than full use being made of our Nation's engineering and scientific talent. We have observed such things as the pirating of key technical employees from the Federal Government by defense contractors often operating on a cost-plus-fee basis, a turnover of engineers and scientists both in Government and private industry activities, and the tendency to underutilize the knowledge and skills of highly qualified personnel.

The subcommittee also has noted the fact that the Federal Government has adopted a policy of contracting more and more of the functions which, in the past, have been performed within Government. The contractors, to a degree subsidized by the Government with cost-plus contracts awarded frequently on a negotiated basis, have little or no incentive to hold defense costs down or to exercise as tight an administrative control over personnel matters as might be desired.

As early as December 1957 this subcommittee discussed in public hearings with officials of the Department of Defense the ineffective utilization of engineers and scientists on missile projects and the use of contractors. At subsequent public hearings with the military departments in 1958 and 1959, continuing inquiries were made into such personnel management factors as turnover, defense contractor recruiting costs, professional salary levels in Government and in private industry, and defense contractor fees. These inquiries have resulted to date in the following three reports by the subcommittee: "Preliminary Report on the Aspects of the Missile Program in the Departments of the Navy and the Air Force," April 1959, "Contracting Out Government Responsibility for Administrative Management and Other Services," June 1959, and "Personnel Procurement Costs of Selected Contractors for Recruitment of Engineers and Scientists, fiscal year 1959."

The subcommittee's investigations raised several questions regarding the management of personnel in the Defense Department's missile programs. These items were referred, on February 10, 1959, to the Comptroller General of the United States for further information.

The Comptroller General, on October 21, 1959, provided a preliminary report, covering the use of supplementary payments by defense contractors for employees in "isolated" areas. This material is found in this report, beginning on page 1.

On May 19, 1960, the subcommittee received a report covering all other items that had been requested of the General Accounting Office and this material is included in this report, beginning on page 8.

The Comptroller General, in his report to the Congress, also on May 19, 1960, entitled "Review of Administrative Management of the Ballistic Missile Program of the Department of the Air Force," indicated his belief that the Air Force should develop its own in-house

capabilities to provide systems engineering and technical direction for the missile programs. This report of the Comptroller General is available as a public document, and is not included herein.

The Air Force announced on June 29, 1960, that it had chosen to continue the use of contractors for directing the various missile and space programs. In so doing the Air Force, by this latest action, has selected a totally new group, the Aerospace Corp., without personnel and without equipment, in place of expanding its own within-house resources.

The subcommittee chairman wrote to the Secretary of Defense on June 7 and July 15, 1960, calling attention to several unanswered questions concerning the Department's plans for managing the missile and space programs, especially in the Air Force. These letters, and the reply submitted by the Secretary of the Air Force for the Secretary of Defense, are included in this report beginning on page 51.

GENERAL ACCOUNTING OFFICE REPORT ON SURVEY OF SUPPLEMENTAL PAYMENTS TO CONTRACTOR EMPLOYEES AT DEPARTMENT OF DEFENSE TEST FACILITIES, OCTOBER 21, 1959

General Comments

In a letter dated February 10, 1959, the chairman, Subcommittee on Manpower Utilization, Committee on Post Office and Civil Service, House of Representatives, requested information on certain items relating to missile programs, including payments of per diem allowances to Government-contractor personnel. The letter cited the varying per diem payments to contractor personnel working at one Air Force base; cited the effect of this practice on the morale of Government employees and other contractor personnel assigned to the base; and asked the General Accounting Office to determine if this was the practice at other military bases, and to ascertain the overall procedures and policies for these payments.

Prior to the request from the subcommittee, the General Accounting Office had reviewed incentive per diem payments under various Air Force contracts held by Douglas Aircraft Co., Inc., Santa Monica, Calif. The review showed that incentive per diem payments were being made by Douglas Aircraft and approved by the Air Force, although the factors of isolation and unfavorable environment, which originally justified such payments, were no longer present. The findings were brought to the attention of the Air Force. The Department of Defense (DOD) informed us that it had independently established a survey group to determine the feasibility of issuing new DOD directives setting up standards and conditions for payment of incentives to contractor personnel.

At a meeting of the Materiel Secretaries,[1] held in July 1958, the Director for Procurement Policy, Office of the Assistant Secretary of Defense (Supply and Logistics), was designated to meet with representatives of the Materiel Secretaries in order to formulate, on a priority basis, a uniform DOD position as to supplemental payments to contractor personnel at DOD test facilities. A survey group was appointed in July 1958, consisting of procurement and industrial relations personnel of the Office of the Secretary of Defense, procurement and legal personnel of the Department of the Air Force, and procurement personnel from each of the other military departments. The Air Force procurement representative was designated as Chairman.

The survey included visits to the following:

1. Offices of Air Force plant representatives and industrial relations staffs of the contractor at Convair Division, General

[1] Composed of Assistant Secretary of the Army (Logistics), Assistant Secretary of the Navy (Materiel), and Assistant Secretary of the Air Force (Materiel).

62340—60——2

Dynamics Corp., San Diego, Calif.; Douglas Aircraft Co., Inc., Santa Monica, Calif.; and Lockheed Aircraft Corp., Burbank, Calif.

2. The Air Force Ballistic Missiles Office, Inglewood, Calif., now known as the Air Force Ballistic Missiles Center.

3. Officers of the International Association of Machinists, Los Angeles, Calif.

In addition, the survey group considered studies made by the military services of test facilities at Edwards Air Force and rocket bases, Holloman Air Force Base, White Sands Missile Range, and Patrick Air Force Base. Navy facilities were not included in the survey.

We have been informed that the survey has been completed and that the report of the survey group is being reviewed at the Office of Secretary of Defense level.

We brought these developments to the attention of representatives of the subcommittee, who agreed that no further fieldwork by this office was necessary at this time. We are submitting our findings on the developments to date at the request of the subcommittee staff.

FINDINGS

General Accounting Office review disclosed that contractor employees receive travel allowances although located at Edwards Air Force Base for extensive periods

Incentive per diem payments were made to employees at Edwards Air Force Base (AFB), although the factors of isolation and unfavorable environment, which originally justified such payments, were no longer present.

The General Accounting Office reviewed the payment of incentive per diem under various Air Force contracts held by Douglas Aircraft Co., Inc., Santa Monica, Calif. This review showed that, as of November 3, 1957, there were 1,054 Douglas Aircraft employees assigned to Edwards Air Force Base and Edwards Rocket Base, 719 of whom were on an extended travel assignment status and receiving per diem payments of $7 each, for a daily total of $5,033. About 65 percent of these payments were being charged to Air Force and Navy cost-plus-a-fixed-fee contracts and virtually all the remainder to Navy fixed-price contracts. Since all the 719 employees had been classified as key technical and supervisory personnel by Douglas Aircraft, the administrative contracting officer had approved the per diem payments and had also reviewed the approvals in January and June 1957, as provided in Air Force procurement instruction (AFPI). Included in the number of employees receiving per diem were 3 employees who had been receiving per diem for over 10 years, 6 for 7 years or more, 17 for 5 years or more, and 66 for 2 years or more.

Section 54–911 of AFPI povides that incentive pay or per diem will be granted only where justified by all the circumstances and that a frequent review will be made with prompt termination and modification as changing conditions warrant. Incentive pay or per diem was originally given to contractor employees at various Air Force test bases as a bonus for accepting such employment, or because of the isolation or unfavorable environment of the location. In 1950, Edwards Air Force Base and the adjacent cities of Lancaster and Palmdale,

Calif., were comparatively isolated. But, since that time, these cities have become easily accessible by highway or rail transportation and have increased in population from an aggregate of about 12,000 in April 1950 to about 45,000 in July 1957. During this same 7-year period, dwelling units in Lancaster and Palmdale increased from about 4,000 units to about 17,000 units. The cities provide transportation, education, recreation, marketing, and health facilities, as well as police and fire protection. We, therefore, concluded that, in view of the growth and development of this area over the 7 years, it could no longer be considered an isolated or unfavorable environment.

We brought this information to the attention of the commander, Air Materiel Command, on April 23, 1958. We were advised that the matter was of concern to the Air Force; however, they questioned the advisability of unilateral action on the part of one contractor, or even the Air Force, because of possible disruption of high priority programs.

We reported this situation to the Assistant Secretary of the Air Force (Materiel) on September 9, 1958, commenting that it might not be practicable at that time to insist on early termination of incentive pay to employees of Douglas Aircraft at Edwards Air Force Base. We recommended that the Air Force continue to review the matter periodically and prescribe procedures which will provide for the gradual elimination of such payments and that any new approval of such payments include provision for termination within a reasonable time after suitable facilities become available for employees of contractors.

The Assistant Secretary of the Air Force advised this office on October 7, 1958, that the subject of supplemental payments to contractor employees had been of serious concern to the Air Force for some time, and it has imposed certain administrative controls to minimize the possibility of exessive payments. He stated, however, that such controls have not been entirely effective because of the lack of uniformity of treatment by all the military departments, with respect to each contractor and test site involved. Consequently, the Air Force, in June 1958, recommended to DOD the establishment of a survey group to determine the feasibility of issuing a DOD directive setting up standards and conditions for incentive payments to contractor employees.

DOD study shows need for control of supplemental payments made by defense contractors at DOD test facilities

Personnel and files made available by the DOD indicated that a recent review by the special survey group, composed of personnel of DOD and the military departments, disclosed a need for control of the varying supplemental payments being made to contractor employees as an incentive for working temporarily, or indefinitely, at DOD test facilities in the United States. However, we have been informed that the group has been unable to agree on a means for controlling this situation and the matter is currently under review in DOD.

The survey group found that supplemental payments were being made to contractor employees, in addition to their normal compensation, as an incentive for working temporarily, or indefinitely, at Army and Air Force test facilities in the continental United States

and that all the military departments recognized such costs as allowable under defense contracts.

Reasons for supplemental payments by contractors

The survey group reported the following reasons for supplemental payments:

1. The most basic cause is that the test sites have been established in remote and underdeveloped areas, often with an undesirable climate and abnormal or substandard living conditions.
2. The unavailability of an adequate and appropriate labor supply in the test site locality necessitates the importation of skilled labor into such areas and in competition with areas of greater desirability. Often, this must take place in an extremely short period of time.
3. Employees are reluctant to move to, or take employment in, circumstances where the duration of the employment and the uncertainties of working conditions result in economic and social contingencies from the employee's point of view, which must in some way be overcome by an incentive.
4. The element of hazard is involved in testsite work. (This problem of hazard pay was not studied by the survey group and was considered outside of its assignment.)
5. Contractors compete for the available labor in an unusual labor market, with the result of proselyting among contractors.

Variation of supplemental payments among contractors

The survey group reported that, as of the fall of 1958, supplemental payments varied in amount as to the contractors and test facility location and as to class of employees involved. They also vary in the form in which they are paid and the basis on which they are computed. Of contractor employees who receive supplemental pay, a few receive a minimum of $60 a month and a few receive a maximum of $450 a month. The average appears to be around $300 a month; the lower amounts being paid to the less skilled and lower level employees, the greater amounts being paid generally to higher level specialists and administrators. At the Edwards Air Force Base facilities and at Holloman Air Force Base, some 70 to 80 percent of contractor employees received supplemental pay; at Patrick Air Force Base, the figure is about 25 percent.

Policies and controls over contractors' payments

The survey group found that certain administrative controls have been imposed by various procuring agencies to minimize the need for supplemental pay, including periodic reviews and requirements for contractors to provide justification for continuing supplemental pay. The survey group found also that such controls generally have not been effective; that to some extent the original or continuing weakness in these controls may be due to inconsistency between research and development areas and procurement activities, between lower and higher echelons of authority, or between the same levels of authority at different times; and that often procurement agencies have been without guidance from higher authority.

The survey group reported that the Deputy Director for Ballistic Missiles, Air Materiel Command, ordered that a fixed maximum of supplemental pay for a fixed temporary period of time, i.e., in effect

a dislocation allowance, may be recognized as a cost incurred by Air Force missile contractors at Vandenberg Air Force Base and that nothing further in the way of supplemental pay would be recognized. One contractor complained that this directive upset its plans and policies; however, the survey group found that the directive appeared to have been successful in controlling these costs at this base without interfering with the contractor's missions.

Views of those contacted by the survey group

Some of the views of those interviewed by the survey group indicated that—

1. A representative of the Air Force Ballistic Missiles Office believed that an absolute and abrupt termination of recognition of supplemental pay was feasible and desirable.
2. One contractor was of the view that, if all contractors were subject to the same policies, all supplemental pay could be terminated, because the basic reason for its existence is competition and proselyting among contractors.
3. Another contractor appeared to believe that to some extent a gradual and uniform reduction or phaseout of supplemental pay was possible.
4. Another contractor proposed the promulgation of a uniform set of guidelines to be applied by each contracting officer on a case-by-case basis.
5. The representatives of the machinists were generally of the view that the question of supplemental pay was strictly one for collective bargaining and that, if DOD policy was to effect these payments in any manner, DOD should overtly be represented in the bargaining process; otherwise, DOD represents a powerful but invisible presence at the bargaining table.

Problem areas in making supplemental payments

The survey group summarized the following problem areas:

1. As the existing test facilities expand and the number of test facilities increase, it is anticipated that the problem of varying supplemental payments will become more acute.
2. Lack of similarity of treatment of this element of cost where several contractors and/or more than one department are involved at a test facility.
3. Some labor-management agreements between contractors and employee unions contain provisions governing supplemental payments.
4. Some Government contracts contain the commitment to reimburse supplemental pay as costs.

Conclusions and recommendations of DOD survey group

The survey group, in reporting its findings, concluded that, in many cases, supplemental pay is justified but the cost principles presently contained in the Armed Services Procurement Regulations are not adequate to achieve an improvement in the present situation; that greater uniformity is warranted, but the impact of DOD policy on existing collective bargaining agreements should be minimized; that the practice, in many cases, resulted in unnecessary and unreasonable

costs to the Government; that some action is required to reduce or eliminate those payments which are unreasonable and unnecessary; that the amount and manner of payments are the responsibility of the contractors; that a continuing review and control of supplemental pay are necessary and desirable; and that changing conditions at test facilities should be recognized.

The survey group prepared a draft of suggested DOD instructions representing one possible approach to a solution of the problem. The draft provided that—

1. At each test facility, the appropriate military Secretary, or his designee, after appropriate interservice consultations, will make a basewide determination whether any supplemental pay at that facility may be recognized and, if so, he will set an overall limit on the recognizable amount. This will be implemented through the usual administrative and auditing procedures under each contract.
2. This determination will be made yearly, and in accordance with guidelines in the instruction.
3. Exceptions may be approved in specific instances by the Secretary of a military department, or his designee.

Three members of the survey group concurred and three did not concur in the proposed instructions.

Differing views within the survey group

The work of the survey group was extended in an attempt to obtain a unanimous or majority view on the draft instructions, or an acceptable alternative. The chairman's request for final concurrence by the members of the survey group on its proposed report and the draft instructions resulted in three concurrences and three nonconcurrences. There were five general areas of objection to the draft instruction, all supported by argument, namely:

1. In the proposed instructions, the DOD and military departments assume responsibilities which normally belong to the contractor.
2. The proposed directive will make the DOD and military departments subject to the charge that they are interfering with collective bargaining between labor and management.
3. The proposed instructions are complicated and would be burdensome in their implementation.
4. There was doubt that the proposed instructions will reduce costs.
5. There was doubt that the proposed instructions will reduce inequities.

In view of the apparently irreconcilable differences within the survey group, it was recommended that the matter be referred to the Materiel Secretaries of the Departments of the Army, Navy, and Air Force for further review and resolution.

Current status of the survey at DOD

In view of the recommendations of the survey group, the matter was referred to the Materiel Secretaries of the departments by the Director for Procurement Policy, Office of the Assistant Secretary of Defense (Supply and Logistics), for further review and resolution.

The Director of Procurement Policy asked the Department to resolve two questions:

1. Is uniformity among the military services feasible?
2. What procedures are necessary to implement any policy issued to correct the situation?

At the time of this report, we have been informed that the staff of the Assistant Secretary of Defense (Supply and Logistics) is continuing to consider the problems mentioned and is specifically considering the situation at Cape Canaveral as the basis for the development of a policy position. Conclusion of this consideration is expected in the near future.

GENERAL ACCOUNTING OFFICE REPORT ON SURVEY OF CERTAIN ASPECTS OF THE BALLISTIC MISSILE PROGRAM OF THE DEPARTMENT OF THE AIR FORCE, MAY 19, 1960

General Comments

In a letter dated February 10, 1959, the chairman, Subcommittee on Manpower Utilization, Committee on Post Office and Civil Service, House of Representatives, requested information on certain aspects of the Air Force ballistic missile program. We were informed subsequently that no information need be furnished with respect to items (*d*) and (*e*), relating to the recruitment by Government-subsidized contractors of retired military officers and civilian employees of the Military Establishment. In report dated October 21, 1959, we furnished information with respect to item (*e*), relating to supplemental payments to contractor employees at Department of Defense test facilities. Information concerning the remaining questions, items (1) through (8) and (*a*) and (*b*), is presented in this report, together with additional information concerning item (*c*).

The information contained herein was developed in conjunction with our initial review of the administrative management of the Air Force ballistic missile program. The scope of our review is discussed on page 50.

Findings

STANDARDS FOR DETERMINATION OF REASONABLENESS OF FEES

"(1) *What standards have been and/or should be established by the Federal Government to determine the reasonableness and uniformity of fees in cost-plus contracts? For example, our hearings developed a noticeable difference in cost-plus fees as well as salaries paid by various missile contractors. Ramo-Wooldridge Corp. (now Space Technology Laboratories) was paid an average fee of 11.9 percent with average salary of key employees at $30,732. Applied Physics Laboratory (Johns Hopkins University) was paid an average of 4.6 percent fee and their average salary of key personnel was $15,540.*"

Summary

The Department of Defense has established maximum limits and has identified factors to be considered in determining the reasonableness of fees. However, precise standards for the determination of reasonableness and uniformity of fees have not been established in view of considerations involved which are not readily measurable or are of such a nature that it is usually necessary to arrive at the rate of fee through negotiation. Consequently, the establishment of a reasonable fee involves effective administration rather than rigid regulation.

The fixed fee initially awarded by the Air Force to Ramo-Wooldridge Corp. (R–W), now Space Technology Laboratories, Inc.

(STL), a wholly owned subsidiary of Thompson Ramo Wooldridge, Inc. (TRW) for technical direction and systems engineering for the ballistic missile program approximated 14.3 percent of the costs estimated when the contract was definitized. A fixed fee of $460,000, or 9.85 percent, had been recommended for approval by the Procurement Committee, Air Materiel Command, which normally is the final contract reviewing authority in the Air Force. At the request of the Assistant Secretary of the Air Force (Materiel), the contract was presented to him for consideration before release, and he directed that the fee be increased to somewhere between $600,000 and $700,000, inasmuch as he felt that the fee of $460,000 did not represent adequate compensation. A fixed fee of $668,000, or 14.3 percent of estimated costs, was then approved. The 14.3-percent was authorized for more than 2 years and was then lowered to approximately 10 percent of estimated costs. The total fees paid R–W/STL under the initial contract for systems engineering and technical direction amounted to $5,127,111, or 11.14 percent of approved costs.

Comparison of the rate of fee paid to R–W/STL with the rate paid to Applied Physics Laboratory (Johns Hopkins University) is not necessarily an appropriate measure of the reasonableness of the fees authorized. There are many different considerations not subject to precise measurement which apply to the establishment of a reasonable fee. In addition, Applied Physics Laboratory is a nonprofit organization, whereas R–W/STL is a commercial organization whose fees may provide for absorption of costs not reimbursable under the contracts as well as payment of income taxes and dividends.

In view of your findings that the average salaries paid by various missile contractors differed noticeably, we made a comparison of salaries paid by R–W/STL to its professional scientific personnel with salaries paid by other firms to personnel having comparable education and experience, following the approach used by the Los Alamos Scientific Laboratory of the University of California for many years in reporting national industrywide surveys of salaries of professional scientific personnel. We found that the salaries paid by STL for professional scientific personnel other than key employees have been higher than the average salaries paid by other organizations for personnel having comparable education, degree, and the same number of years of experience. Our analysis did not include salaries of the relatively few key employees in view of the fact that such salaries would be affected to a substantial degree by the organizational structures and the nature of the activities of the industrial firms and research institutes included in our review. These factors cannot be measured definitely or objectively and do not apply to the vast majority of the professional scientific personnel employed by STL and the other organizations included in our review.

The salaries paid by R–W/STL to its employees were approved by the Air Force administrative contracting officer (ACO) in accordance with established procedures. Salaries of $15,000 per annum and over were reviewed and approved individually, and in many instances proposed increases were disapproved.

Standards for fees

Precise standards for the determination and uniformity of fees in cost-plus-a-fixed fee (CPFF contracts have not been established

in view of the various considerations involved which are not readily measurable or are of such a nature that it usually is necessary to arrive at the rate of fee through negotiation. However, the Department of Defense has established fee limitations and has identified factors to be considered in determining the reasonableness of fees.

Pursuant to 10 U.S.C. 2306(d), the fee for performing a CPFF contract for experimental, developmental, or research work may not exceed 15 percent of the standard cost of the contract. Armed Services Procurement Regulation (ASPR) 3-404.3(c) authorizes designated officials in the military departments to approve fixed fees for such contracts at not to exceed 10 percent and requires that contracts with fees in excess of this limitation be approved by the Secretary of the Department or his designee. ASPR 3-808 sets out certain criteria for consideration in determining a fair and reasonable fee, such as the effect of competition, degree of risk, nature of work to be performed, extent of Government assistance, extent of the contractor's investment, character of the contractor's business, contractor's performance, nature and extent of subcontracting, and the reasonableness of the contract cost estimate.

Standards for reimbursable costs

Research and development contracts, such as those with Ramo-Wooldridge Corp., now Space Technology Laboratories, Inc. (R-W/STL), and Applied Physics Laboratory, generally are negotiated on a CPFF basis to cover a given period, normally 1 year. The estimated cost of the contract work is based on the anticipated expenditures to be made during the contract period, a major portion of which generally represents salaries of personnel. A significant element in the estimate of cost for performing continuing research and development work is the actual cost previously experienced, particularly where the cost consists mainly of items of a recurring nature, such as salaries and rentals. Consequently, increases in continuing costs tend to cause increasing fees in subsequent contracts. Under these conditions and in the absence of competition, there is little incentive for a contractor to minimize costs.

The Armed Services Procurement Regulation, section XV, as revised on November 2, 1959, contains general cost principles and procedures for the determination and allowance of costs in connection with the negotiation and administration of cost-reimbursement-type contracts and contains guidelines for use, where appropriate, in the evaluation of costs in connection with certain negotiated fixed-price contracts and contracts terminated for the convenience of the Government. These cost principles contain guidelines for determining the reasonableness of salaries and wages, including executive salaries, which provide, in part, as follows:

15-205.6 COMPENSATION FOR PERSONAL SERVICES.

(a) *General.* (1) Compensation for personal services includes all remuneration paid currently or accrued, in whatever form and whether paid immediately or deferred, for services rendered by employees to the contractor during the period of contract performance. It includes, but is not limited to, salaries, wages, directors' and executive committee members' fees, bonuses (including stock bonuses), incentive awards, employee stock options, employee insurance, fringe benefits, and contributions to pension, annuity, and management employee incentive compensation plans. Except as otherwise specifically provided in this ASPR 15-205.6, such costs are allowable to the extent that the total compensation of individual employees is reasonable for the services rendered and they

are not in excess of those costs which are allowable by the Internal Revenue Code and regulations thereunder.

(2) Compensation is reasonable to the extent that the total amount paid or accrued is commensurate with compensation paid under the contractor's established policy and conforms generally to compensation paid by other firms of the same size, in the same industry, or in the same geographic area, for similar services. In the administration of this principle, it is recognized that not every compensation case need be subjected in detail to the above tests. Such tests need be applied only to those cases in which a general review reveals amounts or types of compensation which appear unreasonable or otherwise out of line. However, certain conditions give rise to the need for special consideration and possible limitation as to allowability for contract cost purposes where amounts appear excessive. Among such conditions are the following:

(i) Compensation to owners of closely held corporations, partners, sole proprietors, or members of the immediate families thereof, or to persons who are contractually committed to acquire a substantial financial interest in the contractor's enterprise. Determination should be made that such compensation is reasonable for the actual personal services rendered rather than a distribution of profits.

(ii) Any change in a contractor's compensation policy resulting in a substantial increase in the contractor's level of compensation, particularly when it was concurrent with an increase in the ratio of Government contracts to other business, or any change in the treatment of allowability of specific types of compensation due to changes in Government policy.

(iii) The contractor's business is such that his compensation levels are not subject to the restraints normally occurring in the conduct of competitive business.

The cost principles contained in ASPR prior to November 2, 1959, contained less guidance in the way of evaluation factors for determining the reasonableness of compensation for personal services.

In recognition of the fact that many factors govern the reasonableness of salaries of key or executive personnel, and in view of the guidance now contained in the ASPR, we do not have any recommendations at this time as to any specific restrictions that should be established concerning salaries paid by a contractor and reimbursed by the Government.

Fee awarded R–W

The fixed fee initially awarded by the Air Force to R–W for providing technical direction and systems engineering for the ballistic missile program approximated 14.3 percent of the costs estimated when the contract was definitized. A fixed fee of $460,000, or 9.85 percent, had been recommended for approval by the contracting officer and approved by the Procurement Committee, Air Materiel Command, which normally is the final contract reviewing authority in the Air Force. At the request of the Assistant Secretary of the Air Force (Materiel), the contract was presented to him for consideration before release, and he directed that the fee be increased to somewhere between $600,000 and $700,000, inasmuch as he felt that the fee of $460,000 did not represent adequate compensation. A fixed fee of $668,000, or 14.3 percent of estimated costs, was then approved.

The 14.3-percent fee originally applied to the initial period of contract AF 18(600)–1190—May 3, 1954, through October 31, 1955. This rate was approved by the successor Assistant Secretary for the following period of the contract—November 1, 1955, through June 30, 1956. The fee for the work to be performed during subsequent periods—July 1, 1956, through December 31, 1957—was lowered to approximately 10 percent of estimated costs. The total fees paid R–W/STL for technical direction and systems engineering under contract AF

18(600)-1190 amounted to $5,127,111, or 11.14 percent of approved costs, per contractor's records.

The reasons for the decrease in the fee percentage were explained by the Air Force contracting officer during congressional hearings in February 1959, as follows:

> Well, there are a number of factors involved. One of the biggest, of course, was the fact that the size of the contract increased very rapidly. And what might be a fair and reasonable percentage fee on a small contract would tend to be too high on a larger contract.
>
> Secondly, there was an analysis made during this negotiation of return on invested capital, which indicated that for the contract which we were negotiating, looking forward, that a fee of something in the neighborhood of 10 percent gave a more reasonable return on invested capital. I think these are the two major factors that were considered. Although this was a complete fresh, new look at fair and reasonable fee for a contract which was—we were negotiating on a prospective basis.

In addition, the Air Force pointed out that it was attempting at that time to establish a reasonable fee pattern for the ballistic missile contractors and that it had determined that the R-W contract should bear about a 10-percent fee.

Follow-on contract AF 04(647)-165, as subsequently amended, provided for a fixed fee of $3,125,000, approximating 9.2 percent of estimated costs for services in calendar year 1958. Contract AF 04(647)-309 provides for a fixed fee of $6,485,000, or 9.52 percent of the estimated costs of work for the period January 1, 1959, through June 30, 1960.

Our findings with respect to the negotiation of the 14.3-percent fee initially awarded for contract AF 18(600)-1190 are discussed in greater detail below.

On July 22, 1954, R-W, then operating under letter contract AF 18(600)-1190, submitted a definitive contract proposal showing estimated costs of $3,575,000 and a fixed fee of $291,694, or 8.16 percent of estimated costs.

On September 8, 1954, the Assistant Secretary of the Air Force (Materiel) directed the Western Development Division (now Ballistic Missile Division, BMD) to amend the proposed contract to include technical direction and systems engineering responsibility. To reflect these material changes in the task, R-W submitted a revised proposal on October 8, 1954, estimating costs at $751,200 for the period May 3 through October 31, 1954, and $7,918,200 for the period November 1, 1954, through October 31, 1955. Of the total estimated costs of $8,669,400, subcontracting was included at an estimated cost of $4 million. R-W, in submitting the revised cost proposal, advised that the proposed fixed fee was not included in order to expedite negotiations and that, prior to the preparation of a contract document, this proposal would be amended to include the contractor's proposed fixed fee.

During negotiations, the $4 million representing subcontracts was deleted from the costs estimated by R-W as it was determined that such work would be contracted for directly by the Air Force.

On November 12, 1954, R-W informed the commander, BMD, that, because of the unusual relationship contemplated under the contract among the industrial contractors, the Air Force, and R-W, and the degree of responsibility planned for R-W in the ballistic missile program, R-W did not feel that normal negotiation of the fee was appro-

priate. R–W advised that it would accept whatever fee the Air Force determined to be reasonable and proper, stating that it knew the fee would be properly related to its extent of responsibility in the program.

The contractor set forth the following matters for consideration by the Air Force in determining the amount of the fee:

1. In the past, technical supervisory responsibility of the type here involved has been associated with a prime contractual arrangement whereby most of the work done on the project by other contractors is handled as subcontracted work and is included in the base upon which the prime contractor's fee is computed. However, in this case, although the total expenditures for the fiscal period under consideration will be between $100 and $150 million, only $4.5 million will be spent for R–W services. Even arrangements for closely supervised research investigations by other companies to assist R–W in its activities will be handled by direct contracts with the Air Force, and thus the cost of this work (apparently estimated at $4 million) also will be excluded from the fee base.

2. The ICBM program may ultimately involve in value the manufacture and sales to the Air Force of 2 billion dollars' worth of equipment on which industry will obtain profits of about $200 million. Participation by R–W in this business is specifically denied by the contract even though the profits secured by other companies will come about, at least in part, through the success of R–W efforts. It is unprecedented for a research and development contract with an industrial organization to carry such a financial penalty.

3. R–W's participation in the ICBM project has cost the company all other major Air Force work.

4. Practically all the fees received will go into building up the company, primarily for Government work and largely in behalf of Air Force activities. The funds required to support the project will total about $1 million in the next year. R–W is depending on profits as a major source of these funds since its borrowing position will not be very good until it can show better prospects of ultimate production than are currently developing.

In conclusion, R–W stated:

To summarize our position: As technical men we are happy to be associated with the intercontinental ballistic missile project because of the opportunity it provides for important and useful work, but as businessmen we are reasonably sure that the financial soundness of our company and prospects for future return would be better today if we had avoided any such association. If possible, we would like to see a better correlation between the strengths of our technical and fiscal position.

According to Air Force records, early negotiations with R–W under contract AF 18(600)–1190, the initial contract for systems engineering and technical direction of the Air Force ballistic missile program, were conducted by the Special Aircraft Project Office (SAPO), a unit of the Air Materiel Command (AMC) located at the BMD complex, Inglewood, Calif., and now known as the ballistic missile center (BMC). As reported by SAPO:

There were one or two sessions in which we [SAPO] pointed out very questionable provisions during a period in which it appeared we [SAPO] might be

charged with writing and negotiating this deal. In fact, we [SAPO] had reached the point of informal understanding with the contractor's representatives that a somewhat normal CPFF fee in the 6- to 8-percent bracket would be acceptable, and that some of the terms and conditions required material altering before acceptance by MCPC [Procurement Committee, AMC] could be anticipated.

However, negotiation of the definitive contract was then taken over by the Air Research and Development Command (ARDC) contracting officer.

On November 15, 1954, the ARDC contracting officer submitted the R–W contract proposal to the Procurement Committee, AMC, for review and approval. This contract proposal specified estimated costs of $4,669,400 and fixed fee of $460,000, or 9.85 percent of cost. On November 30, 1954, the Procurement Committee returned the contract without approval, objecting, among other reasons, that the fixed fee was excessive. The Procurement Committee pointed out with respect to the fee:

* * * that the Special Assistant (Research and Development) to the Secretary of the Air Force in memorandum October 18, 1954, has stated that he feels very strongly that the maximum percentage fee should be 6 percent, * * *.

The Procurement Committee further indicated that a 6-percent fee would yield $280,000, which in its opinion would be "liberal."

On December 14, 1954, the contracting officer resubmitted the contract to the Procurement Committee. In support of the proposed fee of $460,000, the contracting officer advised that he had been informed by the Special Assistant to the Secretary of the Air Force that the latter's suggestion that the fee be limited to 6 percent was based on the contractor's original cost proposal which included subcontracting. The contracting officer stated that there was more than sufficient justification for the fee he had negotiated.

On December 15, 1954, the Procurement Committee recommended approval of the proposed contract. This contract provided for estimated costs of $4,669,400 and fixed fee of $460,000 as previously submitted by the contracting officer.

Although review of a contract by the Procurement Committee is normally considered final within the Air Force, the Assistant Secretary of the Air Force (Materiel) specifically requested that the R–W contract be presented to him for consideration before release in view of its unusual nature. Following his review of the contract, the Assistant Secretary advised the contracting officer that the fee of $460,000 did not represent adequate compensation to R–W. Consequently, the Assistant Secretary directed that the fee be increased to somewhere between $600,000 and $700,000.

Pursuant to this instruction, the contracting officer notified BMD on December 17, 1954, that he would reopen negotiations with R–W. On January 29, 1955, contract AF 18(900)–1190 was definitized, providing for estimated costs of $4,669,400 and a fixed fee of $668,000, or 14.3 percent of costs. On the same day, the Assistant Secretary executed a findings and determinations document, as required by section 2306(d), title 10, United States Code, in which the fee was approved as being in the best interest of the Government.

According to memorandum of January 29, 1955, on "Substantiation of Ramo-Wooldridge Fee," the contracting officer recommended, and the Assistant Secretary approved, the 14.3-percent fee on the basis that it would represent fair compensation to R–W for its work

in the Air Force ballistic missile program. Various factors were cited, such as the high priority of the program, its technical complexity, the contractor's unique scope of responsibility, its ability to attract qualified personnel, and the potential risk to its reputation if Government support for the program were to fluctuate drastically. The memorandum pointed out that the contract restricted R–W from doing either development or production work on the intercontinental ballistic missiles (ICBM's) without specific approval by the Secretary of the Air Force, and also excluded subcontracting from the estimated cost on which the fee is based. In addition, the contractor was expected to devote 75 percent of its efforts exclusively to the ballistic missile program during the initial phase of the contract covering 18 months.

We were informed by the Air Force that the following changes were made during the contract negotiations at Headquarters, U.S. Air Force, which resulted in benefits to the Government:

1. An option was obtained to purchase two office buildings (Nos. 3 and 4) constructed by the Thompson Products pension trust fund for housing the BMD complex. The decision to acquire these buildings was prompted, according to the Air Force, by the insistence of R–W that approximately $300,000 of nonseverable equipment be furnished by the Air Force for one of these buildings. At that time, the Air Force learned that the cost of this office building was to be charged to the Government over a 5-year period, with ownership to be retained by the lessor. By exercising the option, the Air Force acquired at cost ownership to property reportedly valued at more than $1 million. In our opinion, the decision of the Air Force to acquire these buildings in view of these circumstances was well-advised and essential to protect the Government's interests.

However, according to Air Force records, the Air Force was not aware that R–W had previously entered into a lease with the Thompson Products pension trust fund for another office building (No. 2) at an annual rental of $72,000 for use in the ballistic missile program. This building cost $310,000 exclusive of land cost. Air Force records indicate that, if this information had been known to the Air Force at the time of the fee negotiation, the 14.3 percent fee might not have been authorized.

2. An allowance for reimbursement of general research which had been proposed by R–W and approved by the contracting officer for inclusion in contract AF 18(600)–1190 was eliminated at the direction of the Assistant Secretary. Air Force records disclose the following information concerning this matter:

(*a*) A clause allowing reimbursement of general research costs without limitation had been included in the proposed contract in September 1954 by the Director of Procurement, ARDC.

(*b*) This clause was deleted in November 1954 at the request of the Assistant Secretary.

(*c*) This clause was reinstated with dollar limitations upon insistence by the Director of Procurement, ARDC.

(*d*) Dr. Wooldridge objected to the limitation on reimbursement and discussed this matter with the Assistant Secretary in December 1954.

(*e*) The Assistant Secretary rejected the entire allowance for general research in December 1954.

(*f*) In December 1955, R–W again requested that general research be reimbursed. BMD officials concurred on the basis that general research on certain projects is of advantage to the program.

(*g*) In February 1956, the contract was amended allowing reimbursement of general research expense at not to exceed $100,000 from January 1 to December 31, 1955, and $50,000 for January 1 through June 30, 1956.

Agency comments

In commenting on our report draft, the Air Force stated that the fee awarded R–W/STL is entirely commensurate with the magnitude of the contractor's responsibilities, competence, and invested capital, particularly in view of the restrictions against development and production of components in the ballistic missile program. The Air Force pointed out that the Renegotiation Board has determined that R–W profits were not excessive for the years 1954 through 1957, the only years for which renegotiation has been completed.

Inasmuch as the Renegotiation Board in its determinations as to whether profits are excessive customarily does not confine itself to earnings in individual contracts but considers the overall profits of a contractor, its rulings with respect to R–W's profits would have no application to the reasonableness of the fee on the contract for systems engineering and technical direction in the ballistic missile program. Many considerations entered into the decision as to the amount of fee authorized R–W for its work as systems engineer and technical director of the ballistic missile program, and one of the major factors was the restriction against development or production of components for the programs under its direction. The question as to whether the fees allowed were to high or low is a matter on which there can be differences of opinion.

Comparability of rate of fixed fee for R–W/STL, with Applied Physics Laboratory

As stated by the subcommittee, an average fee of 11.9 percent was paid R–W/STL, whereas Applied Physics Laboratory was paid an average fee of 4.6 percent. Nevertheless, we do not believe that comparison of the rates of fee paid to these two organizations for research and development work is necessarily an appropriate measure of the reasonableness of the fee authorized.

There are many different considerations not subject to precise measurement which apply to the establishment of a reasonable fee, such as the effect of competition, degree of risk, nature of work to be performed, extent of contractor's investment, and extent of Government assistance. In addition, Applied Physics Laboratory is a nonprofit organization, whereas R–W/STL is a commercial organization, whose fees may provide for absorption of costs not reimbursable under the contract, income tax payments, and divided distributions. In view of this difference in type of contractor organization and the several unmeasurable considerations applicable to the establishment of a reasonable fee, we do not believe that the difference in the rates of fees paid these two organizations is a gage of the reasonableness of the fee authorized.

Salaries paid to STL scientific personnel higher than prevailing rates

In view of the subcommittee's finding that a noticeable difference existed in salaries paid by various missile contractors, we made a comparison of salaries paid by R–W/STL to its professional scientific personnel with salaries paid by other firms to personnel having comparable education and experience. We followed the same approach that has been used by the Los Alamos Scientific Laboratory of the University of California for 12 years in reporting national industry-wide surveys of salaries of professional scientific personnel. We found that the salaries paid by STL for professional scientific personnel other than key employees have been higher than the average salaries paid by other organizations for personnel having comparable education and experience, based on data contained in the Los Alamos surveys for the years 1957 and 1958 and on information we obtained from eight California organizations in February to March 1959.

We compared the average salaries of technical employees of STL who had received academic degrees with the average salaries of employees of other organizations holding similar academic degrees, in accordance with the procedure followed in the Los Alamos survey. Employees holding bachelor's (B.S.) or master's (M.S.) degrees in science or engineering, who were engaged in research and development, were treated as one group, while employees holding Ph. D. or equivalent advanced science degrees were treated as a separate group. To recognize the experience factor, employees were grouped by the number of years since receipt of the B.S. degree, and average salaries of STL employees were compared with average salaries paid by other companies to employees in the same experience groupings. Separate comparisons of average salaries of STL employees holding supervisory positions were made with those of employees holding supervisory positions with other organizations, and similar comparisons also were made of salaries paid to personnel in nonsupervisory positions. We found that the average salary of STL professional scientific personnel was almost invariably higher than the average salary of personnel employed by other organizations who had similar academic degrees, and the same number of years of experience, as measured by the period elapsed since receipt of the B.S. degrees.

Our findings are discussed in detail below:

Comparison of STL average salaries for professional scientific personnel with industrywide survey for 1957 and 1958

For the years 1957 and 1958, we compared the average salaries paid by STL to professional scientific personnel with the average salaries paid by other private industry, research institutes,[1] and Government laboratories to personnel with similar education and experience. Our comparison included the aeronautical and electronic industries in view of their predominance in the Los Angeles area. We found that STL average salaries were higher in each of the respective years surveyed.

As stated previously, our comparisons were based on data contained in the "National Survey of Professional Scientific Salaries," prepared by the Los Alamos Scientific Laboratory of the University of California, Los Alamos, N. Mex. The Los Alamos surveys present a

[1] Laboratories operated under grants or endowments, either privately or by colleges and universities.

statistical analysis of salaries and salary trends for employees with bachelor's or master's degrees in science or engineering who are engaged in research and development [2] work. Salaries of employees with a Ph. D. or equivalent advanced science degree are similarly analyzed in these surveys. Contributors to this survey include private industrial companies, research institutes, Atomic Energy Commission (AEC) contractors, consultants, and Government laboratories. Separate detailed analyses are made by specific industry, size of organization, and geographical location. In presenting the data collected from these organizations, the survey reports on salaries paid in each of the years since award of B.S. degree, the academic degrees held, and whether the position held is supervisory or nonsupervisory. Personnel without academic degrees were not reported.

The Los Alamos survey has been conducted for the past 12 years. In 1958, it included data collected from 353 companies, which reported salaries of more than 98,000 employees holding academic degrees in scientific fields. R–W/STL participated in the survey conducted by the Los Alamos Scientific Laboratory during the year 1957.

Comparison of salaries paid by STL for professional scientific personnel with the data contained in the Los Alamos survey for the years 1957 and 1958 shows that the average salary of STL personnel was almost invariably higher than the average salary of personnel working for other organizations who had similar academic degrees and the same number of years of experience. Comparisons of salaries for personnel in supervisory positions showed that the STL average salaries were generally higher for personnel with similar degrees and the same number of years of experience, while STL average salaries for nonsupervisory employees, comprising the bulk of its staff, were almost invariably higher than those paid by other companies for personnel with similar degrees and the same number of years of experience. The analyses for 1958 are shown below:

[2] Research and development is defined in the instructions accompanying the survey questionnaire as "any activity requiring formal technical training and the exercise of scientific judgment in selecting and applying techniques for the solution of problems related to the improvement of existing products, services, or methods," and includes "pure" research.

Comparison of monthly salaries paid by STL with those paid by industry groups to professional scientific personnel occupying supervisory positions, 1958

SUPERVISORY EMPLOYEES WITH B.S.–M.S. DEGREES

Years elapsed since B.S. degree	STL	Electronics	Aeronautical	Research institutes	Government laboratories	Pacific area
0						
1						
2	$542					
3	1,525					
4	800					
5	925	$827	$811	$912	$810	$863
6	1,369	872	851	903	799	913
7	961	925	888	834	836	918
8	1,025	938	911	933	847	949
9	1,070	987	979	881	872	985
10	1,082	1,015	1,026	955	892	1,028
11	1,045	1,070	1,074	986	917	1,061
12	1,104	1,096	1,123	1,018	931	1,124
12	1,246	1,128	1,200	1,075	919	1,193
14	1,255	1,105	1,067	975	957	1,082
15	1,339	1,098	1,154	1,070	987	1,133
16	1,285	1,114	1,173	1,204	973	1,164
17	1,444	1,135	1,153	1,143	943	1,089
18	1,381	1,151	1,202	1,048	941	1,140
19	1,517	1,180	1,189	1,079	965	1,115
20	1,300	1,137	1,142	1,104	975	1,150
21	1,452	1,176	1,221	1,175	991	1,192
22	1,750	1,182	1,150	1,054	967	1,142
23 to 27	1,650	1,143	1,184	1,112	954	1,105
28 to 32	1,475	1,144	1,137	1,171	966	1,083
33 to 37		1,196	918	975	945	867
38 to 42		1,108	1,050	1,275	939	1,075
43 to 47		1,050			886	975
Average	1,246	1,046	1,053	1,043	923	1,057
Number of employees	146	2,774	1,044	400	3,295	1,656

SUPERVISORY EMPLOYEES WITH PH. D. OR EQUIVALENT DEGREES

0						
1						
2						
3						
4						
5		$1,025			$839	$816
6	$1,025	1,175	$1,025		882	1,012
7	975	1,050	1,200	$925	888	1,046
8	1,200	1,075	1,114	925	920	1,057
9	1,258	1,072	1,058	937	925	1,028
10	1,185	1,184	1,100	945	964	1,159
11	1,350	1,240	1,191	918	901	1,141
12	1,425	1,263	1,100	1,130	975	1,225
13	1,265	1,294	1,125	1,016	1,018	1,175
14	1,625	1,278	1,141	959	1,058	1,219
15	1,335	1,232	1,154	1,167	1,003	1,233
16	1,492	1,344	1,308	1,094	1,006	1,211
17	1,508	1,231	1,550	1,261	1,002	1,247
18	1,435	1,317	1,150	1,029	1,050	1,175
19	1,775	1,258	1,425	1,196	1,073	1,206
20	1,400	1,216	1,675	1,108	1,084	1,250
21	1,675	1,475	1,650	1,254	1,108	1,325
22		1,225	1,150	982	1,069	1,244
23 to 27	1,825	1,325	1,158	1,219	1,076	1,256
28 to 32	1,392	1,405	1,250	1,231	1,067	1,245
33 to 37	1,725	1,258	1,225	1,308	1,122	1,058
38 to 42		1,375			1,175	925
43 to 47		1,575		837	1,091	1,075
Average	1,407	1,239	1,202	1,114	1,044	1,189
Number of employees	65	246	63	275	558	345

Comparison of monthly salaries paid by STL with those paid by industry groups to professional scientific personnel occupying nonsupervisory positions, 1958

NONSUPERVISORY EMPLOYEES WITH B.S. OR M.S. DEGREES

Years elapsed since B.S. degree	STL	Electronics	Aeronautical	Research institutes	Government laboratories	Pacific area
0	$539	$504	$502	$460	$416	$462
1	589	555	544	455	475	532
2	634	593	584	498	528	590
3	695	628	616	516	566	632
4	720	656	642	530	597	658
5	797	681	665	565	616	688
6	840	721	704	595	645	728
7	900	754	743	630	677	758
8	936	773	764	677	690	771
9	980	795	806	704	711	816
10	1,018	826	839	695	733	832
11	1,050	837	880	720	735	850
12	1,046	885	908	686	738	905
13	1,092	852	900	690	748	902
14	1,129	884	912	754	796	908
15	1,161	896	925	783	791	894
16	1,171	889	943	816	794	911
17	1,086	910	962	805	761	895
18 to 22	1,194	903	973	799	781	893
23 to 27	1,175	889	925	811	776	866
23 to 32	1,175	905	954	853	767	844
33 to 37		903	924	816	759	848
38 to 42		846	886	631	717	729
Average	908	721	721	632	665	735
Number of employees	489	14,535	10,393	3,345	14,005	10,481

NONSUPERVISORY EMPLOYEES WITH PH. D. OR EQUIVALENT DEGREES

0						
1						
2	$825					
3						
4	808	$800	$808	$681	$710	$737
5	825	827	837	653	767	772
6	895	863	869	696	745	806
7	900	897	935	770	784	872
8	1,000	931	996	781	768	873
9	1,025	937	991	841	757	920
10	1,070	968	994	922	769	966
11	1,058	1,031	1,067	889	827	989
12	1,175	984	1,158	776	846	954
13	1,158	1,010	1,108	909	864	1,004
14	1,208	1,026	1,208	843	931	1,006
15	1,095	997	1,206	933	849	1,034
16		1,060	1,229	903	859	1,017
17	1,387	980	1,108	1,075	862	1,055
18	1,162	978	1,141	853	883	960
19		1,067	1,175	821	881	1,050
20	1,150	1,137	1,081	981	878	1,098
21	1,275	1,033	1,287	1,134	864	1,078
22		1,175	1,183	941	828	1,025
23 to 27		1,175	1,075	1,003	885	1,006
28 to 32		1,217	1,196	1,054	867	1,038
33 to 37		1,040	1,058	1,025	901	1,060
38 to 42	1,275	975	975	952	933	943
Average	1,059	977	1,058	893	839	955
Number of employees	56	669	201	549	1,308	990

Comparison of STL average salaries for professional scientific personnel with those of local industry, February to March 1959

We made a similar comparison of STL average salaries paid for professional scientific personnel with average salaries paid by other organizations, in the same geographical area, to personnel with comparable education and experience. In February to March 1959, we

requested STL and seven other companies in the same area which were also engaged in complex research or development work for the military services to furnish us with information as to the professional scientific personnel currently employed by them. Each of these companies had participated in at least one of the Los Alamos surveys during the previous 2 years, and we asked them to furnish us with information in the same manner that had been furnished previously to Los Alamos. The companies furnished us information on 8,886 employees holding academic degrees in the scientific fields.

We found that STL paid higher salaries for professional scientific personnel than did the other companies in our survey. For example, STL employees with B.S.–M.S. degrees and 15 years' experience who were occupying nonsupervisory positions received average salaries of $1,198 per month, whereas employees of the other companies in our survey who also had B.S.–M.S. degrees, 15 years of experience, and occupied nonsupervisory positions received average salaries of $975 per month. The following analysis by years of experience since receipt of academic degree shows that STL was almost invariably higher than the average for the comparable companies in each of the experience years for employees holding similar degrees and occupying either supervisory or nonsupervisory positions.

Comparison of monthly salaries paid by STL with salaries paid by 7 comparable companies[1] in the same geographical area to professional scientific personnel, February–March 1959

NONSUPERVISORY EMPLOYEES

Years elapsed since B.S. degree	B.S.–M.S.		Ph. D.	
	STL	Other	STL	Other
0	$562	$540		
1	663	592		
2	688	637		
3	788	687		$802
4	796	731	$875	855
5	848	754	875	900
6	874	802	982	918
7	959	818	987	992
8	989	843	1,121	1,003
9	1,032	878	1,075	1,047
10	1,057	903	1,120	1,057
11	1,106	916	1,183	1,135
12	1,095	949	1,100	1,111
13	1,117	975	1,225	1,231
14	1,116	957	1,187	1,150
15	1,198	975	1,145	1,338
16	1,205	986		1,144
17	1,250	994	1,175	1,204
18	1,180	1,022	1,212	1,061
19	1,275	1,014	1,275	1,275
20	1,242	999	1,225	1,075
22	1,362	974	1,275	1,150
24		947	1,325	1,308
26	1,375	939		1,169
28	1,225	913		1,175
30	1,358	967	1,408	1,600
31 and over	1,225	901	1,558	1,008
Average	952	768	1,137	1,052
Number of employees	604	6,553	84	307

[1] Douglas Aircraft Co., Santa Monica Division; Hughes Aircraft Co., Inc.; Jet Propulsion Laboratories, California Institute of Technology; Lockheed Aircraft Corp., Missile and Space Division; North American Aviation, Inc. Missile Division; Thompson Ramo Wooldridge, Inc., Ramo-Wooldridge Division; The Rand Corp.

SUPERVISORY EMPLOYEES

Years elapsed since B.S. degree	B.S.-M.S.		Ph.D.	
	STL	Other	STL	Other
0				
1	$625	$925		
2	700	1,075		
3		815		
4	925	880		
5	825	907		$1,075
6	925	980	$1,150	1,032
7	1,054	1,009	1,075	1,125
8	1,107	1,037	1,292	1,114
9	1,167	1,098	1,508	1,125
10	1,197	1,121	1,275	1,202
11	1,308	1,132	1,496	1,246
12	1,258	1,198	1,492	1,313
13	1,258	1,229	1,500	1,335
14	1,345	1,217		1,264
15	1,564	1,235	1,461	1,365
16	1,400	1,290	1,850	1,461
17	1,369	1,254	1,525	1,492
18	1,489	1,211	1,625	1,300
19	1,800	1,294		1,425
20	1,392	1,257	1,625	1,525
22	1,620	1,247	1,775	1,338
24	1,737	1,248	2,000	1,325
26	1,975	1,294	1,750	1,325
28		1,342		1,400
30	1,562	1,280	1,525	1,325
31 and over	1,825	1,195	1,675	1,125
Average	1,335	1,131	1,505	1,264
Number of employees	167	887	60	134

Agency comments

In its comments on our report draft, the Air Force stated that comparison of R–W/STL salaries with industrywide averages is inappropriate inasmuch as it does—

> not reflect the contractor's unique organization, its technical responsibilities for a program of the highest national priority, or the above average education, experience and ability of its scientific personnel; * * *.

Also, the Air Force stated that the R–W/STL salaries are not excessive inasmuch as both employees and applicants for employment were lost to more attractive offers of other defense firms.

As previously explained, our comparison of salaries paid to STL scientific personnel with industrywide averages was based on data contained in a national survey which has been conducted for the past 12 years. This survey covers employees with bachelor's, master's, or doctor's degrees in science or engineering who are engaged in research and development work. Following the same approach that had been taken in this survey, we excluded from our analysis the salaries of the relatively few corporation executives and top-management personnel. We believe that such salaries would be affected to a substantial degree by the organizational structures and the nature of the activities of the industrial firms and research institutes included in our review. These factors cannot be measured definitively or objectively and do not apply to the vast majority of the professional scientific personnel employed by STL and the other organizations included in our review.

Our comparison of salary rates was based upon the academic degrees held by the employees, the number of years since award of the B.S. degree, and whether the position occupied was supervisory or

nonsupervisory. We believe that these factors afford a reasonable basis of comparison for the bulk of the professional scientific personnel employed at STL, as well as the other organizations included in our review, such as the Rand Corp., Jet Propulsion Laboratory, and Lockheed's Space and Missile Division.

The fact that R–W/STL has lost some employees and applicants to other defense firms does not, in our opinion, disprove the clear showing that average salaries paid by R–W/STL generally have exceeded the average salaries paid by other firms for personnel of comparable education and experience. Turnover is a normal element encountered in personnel management and may be caused by many factors.

R–W/STL salaries approved by Air Force

Salaries paid by R–W/STL were reviewed by the Air Force administrative contracting officer (ACO) for allowance under the terms of the contract in accordance with the procedures established by ASPR, as implemented by Air Force procurement instruction (AFPI).

While AFPI 54–905(b) requires approval of salaries in excess of $25,000 per annum on an individual basis, the ACO reviewed and approved individual salaries of $15,000 per annum and over. These salaries are included in the contractor's executive compensation plan which was submitted by the ACO, with recommended adjustments, to Headquarters, AMC, for review and comments. Headquarters, AMC, accepted these plans as recommended by the ACO.

Contractor salary plans covering employees earning less than the $15,000 per annum were reviewed and approved by the ACO. Approval by Headquarters, AMC, is not required for such salaries.

For salaries of $15,000 or over, the ACO had not disapproved any salaries for new hires. However, in many instances, the ACO had disapproved requested increases. For example, salary increases were proposed by STL for all of its key personnel after R–W merged with Thompson Products Inc., on October 31, 1958, and STL was established as a separate corporation wholly owned by TRW. The proposed increases in salary, ranging as high as $20,000 per annum, were questioned by the ACO. Portions of these increases, ranging as high as $10,000 per annum, were approved for allocation to Government CPFF contracts. We understand that STL is paying the full amounts of the proposed increases.

SELECTION OF R–W FOR AIR FORCE BALLISTIC MISSILE PROGRAM

"(2) *Why was the Ramo-Wooldridge Corp. placed in such an indispensable position in Air Force's long-range ballistic missile operation?*"

Summary

Technical developments and studies in 1953 and 1954 clearly demonstrated the need for prompt and aggressive action to accelerate the long-range ballistic missile program. Accordingly, the Air Force decided in 1954 to contract with a private corporation for the systems engineering and technical direction of the ballistic missile program so as to quickly establish a technical capability to carry out this essential mission as expeditiously as possible. The Air Force felt that

it did not have the in-house capability to technically direct this program and, consequently, arranged to have this void in its organization filled by a contractor.

The selection of R–W to provide systems engineering and technical direction for the ballistic missile program came as an outgrowth of its role with the Strategic Missile Evaluation Committee (SMEC) during late 1953. R–W's role as technical consultant to SMEC; R–W's continued performance in the program on technical studies and analyses; R–W's nucleus of a scientific staff, and its ability to attract others; and R–W's availability, all contributed to the award of the contract to R–W for systems engineering and technical direction of the ballistic missile program.

R–W's role with Strategic Missile Evaluation Committee

In the fall of 1953, SMEC was established to study and evaluate the Air Force strategic missile program. Drs. Ramo and Wooldridge, who had recently left Hughes Aircraft Co., were invited by the Air Force to participate as members of and to provide technical support to SMEC. This was accomplished under letter contract AF 18(600)–1002, dated October 15, 1953, which was definitized on December 3, 1953. The contract provided for R–W to perform technical services and furnish necessary personnel, facilities, and materials to conduct "long-range analytical studies of weapons systems." This work was performed under two task orders. The first was issued on December 3, 1953, and covered a research study of certain means of delivering atomic warheads by ICBM's and preparation of related recommendations on development programs. This task order, issued for the period October 15, 1953, to February 28, 1954 (later extended to June 30, 1954), was the one under which R–W provided a technical staff to SMEC. The second task order, issued on June 17, 1954 (extended to January 31, 1955), was not in connection with the ICBM program but was for long-range planning studies in the fields of electronic countermeasures and air defense.

R–W activities following release of SMEC report

On February 10, 1954, SMEC issued a report to the Air Force recommending, among other things, the establishment of a special development-management agency to reorient the program, supervise research, and exercise general technical and management control over all elements of the program. The Air Force accepted the report and proceeded to implement the recommendations. R–W was continued in the program to perform detailed studies and systems analyses consonant with SMEC recommendations. On May 3, 1954, R–W was awarded letter contract AF 18(600)–1190, which was an outgrowth of task order No. 1 under contract AF 18(600)–1002. The use of a separate contract in this instance was justified by the Air Force as a means to facilitate the mechanics of contract award and administration.

In the spring of 1954, SMEC was reconstituted as the Scientific Advisory Committee with most of the membership remaining the same. Drs. Ramo and Wooldridge were not invited and did not participate as members of this second committee.

On July 20 and 21, 1954, the Scientific Advisory Committee reviewed various ways of reorienting and accelerating the Atlas program

and establishing the development-management group. Western Development Division (WDD), Air Research and Development Command, now known as Ballistic Missile Division (BMD), and R–W presented plans for the organization of the development-management group. These plans provided for R–W to support WDD in a technical staff advisory capacity and that systems responsibility would be vested in the airframe contractor (probably Convair). At this same meeting, Convair representatives made a presentation on their method of managing the Atlas program. The committee rejected both plans and recommended that the development-management organization be studied further and that systems responsibility be clearly assigned either to WDD or to some organization other than an aircraft company.

The Assistant Secretary of Defense for Research and Development, who was present throughout the meeting, advised that either R–W must be a small technical staff to the Air Force and systems responsibility must be assigned to the airframe contractor, or R–W must be placed in a line position and assigned systems engineering and technical direction responsibility. On August 24, 1954, the commander, WDD, who was directed to submit recommendations on the management organization, recommended that R–W be made responsible for technical direction and systems engineering for the ICBM program. This was approved by AMC and ARDC on September 3, 1954, and the Assistant Secretary of the Air Force (Materiel) on September 8, 1954. On January 29, 1955, letter contract AF 18(600)–1190 was definitized and, simultaneously, the scope of work originally authorized was augmented to include technical direction and systems engineering responsibility.

FINANCIAL RELATIONSHIPS

"(3) *What has been the financial relationships between Ramo-Wooldridge, Thompson Products, Inc., and the Space Technology Laboratories?*"

Summary

Thompson Products, Inc., provided the financial assistance for the organization and subsequent expansion of R–W. From inception, September 1953, through the date of the merger of the two corporations, October 1958, in excess of $20 million was made available to R–W by Thompson Products. Thompson Products elected four directors of R–W's nine-man board of directors. In addition, Thompson Products was granted an option, exercisable during the period 1964–66, which would have given Thompson Products full control of R–W. This option was subsequently voided by the merger of the two corporations on October 31, 1958.

STL, formerly Guided Missile Research Division, was established as the division within R–W to provide the technical direction and systems engineering for the Air Force ballistic missile programs. STL remained a division of R–W until the corporate reorganization of October 31, 1958. As of that date, STL began operations as a wholly owned subsidiary of Thompson Ramo Wooldridge, Inc. (TRW).

62340—60——5

Incorporation of R–W with assistance of Thompson Products, Inc.

During September 1953, Drs. Ramo and Wooldridge resigned from Hughes Aircraft Co. to form a new corporation to contract services in the electronics field with Defense Department establishments and industrial and other corporations. On September 14, 1953, Thompson Products, Inc., was invited to finance the new corporation to be known as the Ramo-Wooldridge Corp. This offer proposed that Thompson Products should—

(*a*) Purchase 7,500 shares of class A common stock (par value $1) at $2 per share in cash. Agree to purchase from time to time up to 17,000 additional shares at $2 per share. However, at no time could Thompson Products own more than 49 percent of the total shares of class A and class B common stock outstanding.

(*b*) Purchase the following amounts of preferred stock in cash, at a price equal to the par value of $100 as follows:

	Shares
(1) Oct. 1, 1953	1,500
(2) Feb. 1, 1954	1,000
(3) July 1, 1954	1,000

(*c*) Contract for R–W to survey the Thompson Products electronics activities at the following rates:

(1) $20,000 per month for the last 3 months of calendar year 1953.

(2) $30,000 per month for the first 9 months of calendar year 1954.

(*d*) Loan up to $150,000 in cash for use in obtaining buildings and facilities.

On September 16, 1953, Thompson Products accepted the proposal, and on that date R–W was incorporated in the State of Delaware. The objectives and purposes of the corporation were to carry on research, development, engineering, design, and manufacture of products and to provide consulting services and inventions in the fields of electronics and other branches of physical science and engineering.

Financing R–W operations

With the rapid expansion of the Air Force ballistic missile program, R–W's requirements for additional facilities and personnel increased accordingly. To obtain the necessary capital for the required expansion, R–W entered into credit and stock purchase agreements on June 21, 1955, with Thompson Products whereby—

(*a*) Thompson Products, Inc., would purchase 40,000 shares of R–W cumulative preference stock at the par value price of $100 a share.

(*b*) Thompson Products, Inc., would establish a revolving credit fund to permit borrowing by R–W until June 30, 1961, provided that the aggregate principal amount outstanding does not exceed the following:

Prior to July 1, 1956	$1,000,000
From July 1, 1956 to July 1, 1957	6,000,000
From July 1, 1957 to July 1, 1958	11,000,000
From July 1, 1958 to July 1, 1961	16,000,000
From July 1, 1961 to July 1, 1968	10,000,000
From July 1, 1968 to July 1, 1971	5,000,000

(*c*) Either one of Messrs. Ramos, Wooldridge, George, or Johnson would remain a full-time officer.

In consideration of the credit agreement cited above, options and first refusal rights were granted to Thompson Products, Inc., by the holders of 17,850 shares or 70 percent of the authorized class B common stock. The options so obtained were exercisable only during specified periods in the years 1964, 1965, and 1966, and the option price per share was the higher of $784.31 or an amount to be determined upon the basis of net earnings applicable to class B common stock during a period of 1 to 3 years immediately preceding the exercise of the options. The options were subject to termination if financing was not provided in accordance with the credit agreement referred to above.

These agreements were voided by the subsequent merger of the two corporations on October 31, 1958. As of that date, the notes outstanding under the credit agreement totaled $8,500,000. Thompson Products made available additional capital to a subsidiary of R–W, Pacific Semiconductors, Inc. (See p. 28.)

Capitalization

The capitalization of R–W at inception was as follows:

(*a*) Preferred stock, $100 par value:
Authorized: 4,000 shares.
Issued and outstanding: 1,500 shares.
Purchased by Thompson Products at par value.

(*b*) Class A common stock:
Authorized: 24,500 shares, $1 per value.
Issued and outstanding: 7,500 shares.
Purchased by Thompson Products at $2 per share.

(*c*) Class B common stock:
Authorized: 25,500 shares, $1 par value.
Issued and outstanding: 6.750 shares.
Purchased by Drs. Ramo and Wooldridge at $2 a share.

On October 31, 1958, the date of the merger with Thompson Products, R–W's capital structure was as follows:

(*a*) Cumulative preference stock, 4¼ percent, paid in $4 million:
Authorized: 40,000 shares, $100 par value.
Issued and outstanding: 40,000 shares, all owned by Thompson Products.

(*b*) Preferred stock, paid in $350,000:
Authorized: 4,000 shares, $100 par value.
Issued and outstanding: 3,500 shares, all owned by Thompson Products.

(*c*) Class A common stock, paid in $43,312:
Authorized: 24,500 shares, $1 par value.
Issued and outstanding: 21,656 shares, all owned by Thompson Products.

(*d*) Class B common stock, paid in $45,080:
Authorized: 25,500 shares, $1 par value.
Issued: 25,500 shares.
In Treasury: 2,960.
Outstanding: 22,540 shares, of which 3,750 shares were owned by Thompson Products and 18,790 shares were owned by officers and key employees of R–W.

(*e*) Additional capital paid in, consideration for option granted to Thompson Products, $10,380.

Control of Board of Directors

Class A common stockholders were entitled to elect four directors and class B common stockholders were entitled to elect five directors of a nine-man board. Although Thompson Products subsequently acquired more than 50 percent of the combined outstanding common

stock, through purchases of class B common stock from individual shareholders, control of the board of directors remained in Messrs. Ramo, Wooldridge, and George. This was made possible through a 10-year voting trust agreement entered into by certain holders of class B common stock and Messrs. Ramo, Wooldridge, and George, as voting trustees. Under this agreement, 15,167 shares were deposited, enabling two of the three trustees to elect a majority of the board of directors.

Investments in affiliates

Pacific Semiconductors, Inc. (PSI), was organized on June 22, 1954, as a subsidiary of R–W, to engage in the development and manufacture of transistors, diodes, and related electronic devices. Financial assistance was provided by Thompson Products through loans and purchases of preferred stock. Investments in and advances to Pacific Semiconductors, Inc., at October 31, 1958, by both R–W and Thompson Products were as follows:

	R–W	Thompson Products, Inc.
Preferred stock	$2,501,100	$2,540,000
Common stock	40,000	
Loans		3,600,000
Total	2,541,100	6,140,000

Pacific Semiconductors, Inc., statement of income, 1954–58

	Income	Expenses	Net loss	
			Annual	Cumulative
1954		$381,549	$381,549	$381,549
1955	$35,600	1,371,054	1,335,454	1,717,003
1956	399,519	2,030,248	1,630,729	3,347,732
1957	1,589,826	3,002,495	1,412,669	4,760,401
1958	4,786,408	5,053,385	266,977	5,027,378

The cumulative net loss of $4,760,401 for the years 1954–57 was included in the consolidated Federal income tax returns of R–W for the respective years. This enabled R–W to derive tax benefits of approximately $2.4 million. For 1958, PSI was to file a separate Federal income tax return; therefore, the current net loss of $266,977 will be available for carryover and reduction of the company's taxable income in subsequent years.

On October 31, 1958, PSI became a subsidiary of the surviving corporation, TRW.

Thompson Ramo Wooldridge Products Co. was formed in early 1958 as a joint venture between R–W and Thompson Products for the technical and commercial development of an industrial process control computer (R–W 300). At the date of merger, which terminated the joint venture agreement, Thompson Products' investment was $565,000.

Intercompany transactions

From inception in September 1953 through October 1958, R–W sales to affiliates were approximately $1,900,000, or almost 50 percent of the total commercial sales of approximately $3,850,000.

Merger

R–W and Thompson Products merged on October 31, 1958, and became known as TRW, Inc. Upon consummation of the merger, Thompson Products acquired 100 percent control of R–W and its subsidiaries. The holders of 18,790 shares of R–W class B common stock were to receive 260,376 shares of TRW common stock, plus cash for fractional shares resulting from the exchange of common stock in the new corporation. Drs. Wooldridge and Ramo became president and executive vice president, respectively, of the surviving corporation.

To continue to provide the Air Force with a closely integrated team for the performance of research and development in the ballistic missile and space fields, STL, a division of R–W was established as a separate corporation, its stock being owned and held by the parent corporation, TRW, with 12 percent of the common shares reserved as treasury stock for option to key employees of STL.

In the reorganization, STL received approximately 24.5 million dollars' worth of assets previously held by R–W, including 16 million dollars' worth of property, plant, and equipment. Liabilities in the amount of $13.7 million were also transferred by R–W to STL.

PERSONAL GAINS MADE BY KEY EMPLOYEES OF R–W/STL

"(4) *What personal gains have been made by key employees and former Government employees, military and civilian, in the Ramo Wooldridge Corp. and Space Technology Laboratories as these corporations have become an integral part of Thompson Products, Inc.*

Summary

The officers, directors, and key employees of R–W/STL made extraordinary personal gains, with nominal investments, through their association with the Air Force ballistic missile program. In addition, these persons received substantial salaries and bonuses. With the exception of certain retired military officers who were officers and directors of R–W (see p. 30), we could not ascertain if other former Government employees realized personal gains because information as to individual shareholders and bonus recipients was denied to us.

Investments

Officers, directors, and key employees of R–W/STL were granted stock options as an inducement for employment and for continuation of employment. These options authorized the purchase of R–W class B common stock [3] at $2 per share. Twenty-two thousand five hundred and forty shares of this stock were acquired by 57 officers, directors, and key employees at a total investment of $45,080 during 1953–55. In conjunction with increased financing of R–W's operations, Thompson Products acquired an option to purchase 70 percent of the class B common stock then owned by Drs. Ramo and Wooldridge and their associates at a price not lower than $784.31 per share. This option

[3] All class A common stock was held by Thompson Products.

was voided by the subsequent merger of R–W and Thompson Products on October 31, 1958.

In the merger, each share of R–W class B common stock was exchanged for 13,857 shares in TRW, the merged corporation. On November 3, 1958, the first day that the new shares were traded on the New York Stock Exchange, the closing price was $60 per share. Therefore, an initial investment of $2 for one share of stock in R–W increased in value to $831 at the time of the merger. Of the 22,540 shares originally issued by R–W for $45,080 to its officers, directors, and key employees, 3,750 shares were subsequently sold by these individuals to Thompson Products at prices ranging from $150 to $275 per share. The 18,790 shares held by these individuals at the time of the merger were valued at $15.6 million.

Information as to individual shareholdings was denied to us by TRW. Through review of statements on file with the Securities and Exchange Commission (SEC), testimony given in congressional hearings, and other data, we compiled information as to the individual shareholdings of the officers and directors of R–W. This information was reviewed with the former vice president and secretary of R–W, presently a vice president of TRW, who, in two instances, corrected the data we had compiled. In addition, TRW submitted to us a statistical tabulation of R–W employee shareholdings which agrees in total with the following schedules of R–W shares held as of October 31, 1958, by (1) officers and directors, and (2) other employees;

Class B common stock, Ramo-Wooldridge Corp., as of Oct. 31, 1958

OFFICERS' AND DIRECTORS' SHAREHOLDINGS

Name and title	Employment date	Number of R–W shares held	Market value of TRW shares on Nov. 3, 1958 [1]
Wooldridge, D. E., president and director	September 1953	[2] 3,250	$2,702,100
Ramo, S., executive vice president and director	do	[2] 3,500	2,910,000
George, H. L.,[3] vice president and director	December 1954	[2] 2,750	2,286,400
Johnson, R. P., vice president and director	February 1954	1,000	831,400
Miller, B. F., vice president	June 1954	1,000	831,400
Gates, S. E., general counsel and director and assistant secretary	(4)	600	498,900
Nielson, V. G., vice president and secretary	October 1954	[2] [5] 850	706,700
Mohr, M. E., vice president	March 1954	600	498,900
Saville, G. P.,[3] vice president	February 1955	[5] 600	498,900
Dunn, L. G., vice president	September 1954	500	415,700
Mettler, R. F., vice president	March 1955	350	291,000
Corpening, R. B., assistant secretary	August 1954	50	41,600
Total		15,050	12,513,000

See footnotes at end of table.

Class B common stock, Ramo-Wooldridge Corp., as of Oct. 31, 1958—Continued

OTHER EMPLOYEE SHAREHOLDINGS

Individual shareholdings	Number of shareholders		Number of R–W shares held	Market value of TRW shares on Nov. 3, 1958 [1]
	R–W employees	Former R–W employees		
0 to 49	17	6	610	$507,100
50 to 99	9	2	654	543,700
100 to 149	4		400	332,600
150 to 199	1		150	124,700
200 to 249	1		200	166,300
250 to 299	2		526	437,300
300 to 349	1	1	600	498,900
350 to 399				
400 to 499				
500 to 549				
550 to 599				
600 to 649	1		600	498,900
Total	36	9	3,740	3,109,500
Grand total			18,790	$15,622,500

[1] Market value based upon New York Stock Exchange closing price of $60 per share on Nov. 3, 1958, the first day that TRW shares were traded. Conversion price is based on exchange rate of 1 R–W share for 13.857 TRW shares multiplied by $60 per share.
[2] According to information furnished by R–W to SEC, Messrs. Wooldridge, Ramo, George, and Nielson held 4,334, 4334, 4332, and 1,000 shares, respectively, on Aug. 11, 1956.
[3] Retired military officers.
[4] Not on R–W payroll.
[5] According to information filed at SEC, Mr. Nielson and Mr. Saville had 810 shares and 300 shares, respectively, at Oct. 31, 1958. Mr. Nielson confirmed the stockholdings shown above for all individuals after revising his own holdings to 850 shares and Mr. Saville's holdings to 600 shares.

Salaries and bonuses

The officers, directors, and key employees of R–W also were paid substantial salaries ranging as high as $60,000 per year. We were unable to obtain information from TRW as to the amount of individual bonus payments. However, the maximum annual bonus payment to an individual is reported to have been $15,000. Bonus payments to certain employees were reported as totaling $50,500 for 1955, $104,000 for 1956, and $71,900 for 1957. Our request for information as to bonus payments for 1958 was denied to us.

OPERATING RELATIONSHIP BETWEEN STL, R–W, AND THOMPSON PRODUCTS

"(5) *What is now the operating relationship of the Space Technology Laboratories, Ramo-Wooldridge Corp., and Thompson Products, Inc?*"

Summary

In October 1958, R–W merged with Thompson Products to form TRW. STL, a division of R–W, was established as a wholly owned subsidiary of TRW to continue to provide systems engineering and technical direction for the Air Force ballistic missile program. STL's relationship to TRW is basically financial rather than operational in nature. However, building space and other services have been temporarily provided by STL to TRW pending completion of its own facility.

Separation of STL from TRW

The major reason for the establishment of STL as a separate corporation was the desire of TRW to free itself of the hardware restric-

tion [4] previously imposed upon R–W by the Air Force. TRW wished to dispel suspicions by other companies that information acquired by STL would be given to TRW or its divisions and affiliates. Therefore, in separating STL, the parent corporation took certain steps to evidence a complete separation of all operating relationships between TRW and STL. A separate board of directors was established for STL, with none of the individuals being a director or officer of TRW. However, four of the six principal officers and directors of STL were stockholders of TRW as of February 1959. In addition, the chairman of the board of TRW advised each of the STL board members, as follows:

> In all except financial matters, it is important that the relations between STL and TRW be those of two entirely separate corporations. Therefore, apart from the financial data mentioned above, no information should be provided to any employee or official of TRW about the present or anticipated Air Force projects of STL unless it is specially authorized by the Air Force for release to TRW and other companies in accordance with normal need-to-know procedures. Similarly, in the unlikely event that STL ever assists the Air Force in judging proposals for a project in which TRW is one of the competitors, TRW must be treated no more favorably than any other company. We consider it essential that the directors and officers of STL establish and monitor whatever procedures they find necessary to insure that TRW receives absolutely no special advantages in competition for any Air Force project as a consequence of its financial investment in STL.

However, as a temporary measure pending completion of its own facility, TRW has been provided with space and other services by STL, i.e., telephone services, computing services, etc. At the time of our review, TRW occupied more than one-half of the building space in the Research and Development Center (R. & D.) owned by STL. The R. & D. Center was originally constructed for R–W and was transferred to STL when R–W merged with Thompson Products, Inc. It is expected that TRW will vacate this space by the end of 1960.

DEFENSE CONTRACTS WITH THOMPSON PRODUCTS FOR MISSILE COMPONENTS

"(6) *What contracts did Thompson Products, Inc., have during the past 5 years, either as prime or subcontractor to supply missile components for the Defense Department? Were any of those contracts developed or reviewed by Ramo-Wooldridge Corp., or Space Technology Laboratories?*"

Summary

Thompson Products, Inc., received contracts from the Air Force and subcontracts and purchase orders from various contractors of the Air Force, Army, and Navy for the research, development, and/or production of missile components amounting to $38 million during the period January 1, 1954, through October 31, 1958. The dollar amount of contracts received by Thompson Products, both as prime contractor and subcontractor, under the Air Force ballistic missile program, approximated $15 million during the same period. The bulk of this work involved subcontracts and purchase orders for items previously developed by Thompson Products, such as turbopumps,

[4] The contracts with R–W for systems engineering and technical direction of the Air Force ballistic missile program prohibited R–W from developing or producing components for this program. (See p. 51.)

for which Thompson Products has been a prime source of supply since 1951, and we found no indication that these awards were influenced by STL. Thompson Products also was one of three contractors engaged in the ballistic missile program to develop a movable nozzle, and this work was under STL technical direction.

Thompson Products contracts

A summary of the defense contracts received by Thompson Products, either as a prime contractor or as a subcontractor, during the period from January 1954 through October 31, 1958, the date of the establishment of Thompson-Ramo-Wooldridge, Inc., is reported below:

	Millions
BMD prime contract (as definitized Jan. 2, 1959)	$1.7
Subcontract or purchase orders under BMD contracts	12.9
Total under BMD contracts	14.6
Other Air Force prime contracts (other than BMD)	1.8
Subcontracts or purchase orders under other Air Force contracts	12.5
Total Air Force contracts	28.9
Subcontracts or purchase orders under Army contracts	1.2
Subcontracts or purchase orders under Navy contracts	7.5
Total	37.6

As shown above, the amount of contract work received by Thompson Products in the Air Force ballistic missile program amounted to $14.6 million, of which $12.9 million involved subcontracts and purchase orders received from prime contractors in the program. While subcontracts under the Air Force ballistic missile program are subject to technical review by R–W/STL in its capacity of systems engineer and technical director in the program, we found no indication that the award of these subcontracts or purchase orders was influenced by STL. According to the prime contractors, the bulk of this work involved items previously developed by Thompson Products, such as turbopumps, for which it has been a prime source of supply since 1951.

The prime contract awarded to Thompson Products by BMD was the only contract noted in our review under direct technical evaluation by STL. In the development of propulsion units for the Minuteman, the Air Force required that a movable nozzle be developed. In view of the many problems connected with the development of a reliable movable nozzle, the Air Force contracted with three companies for this work, one of which was Thompson Products, Inc. This contract, AF 04(647)–228, a cost-plus-fixed-fee contract, was awarded to Thompson Products as a letter contract on June 27, 1958, and was definitized January 2, 1959, in the amount of $1.7 million. As amended through June 1959, this contract amounted to $2.3 million. The contract provides for the design, fabrication, and evaluation of a movable nozzle capable of being used for controlling the thrust vector of large solid-propellent rocket engines.

DEFENSE CONTRACTS WITH R–W FOR HARDWARE PRODUCTION

"(7) *Were any contracts, prime or subcontractor, awarded the Ramo-Wooldridge Corp. to produce hardware of any type for the Defense Department?*"

Summary

The contracts with R–W/STL exclude it from engaging in physical development or production of any components for the Air Force ballistic missile program unless expressly approved by the Assistant Secretary of the Air Force (Materiel), or his authorized representative. Although production of hardware by R–W for the ballistic missile program was generally precluded as a result of this prohibition, R–W engaged in the design, development, production or servicing of end items in related fields. These contracts and subcontracts, awarded to R–W by the Defense Department and/or various contractors engaged in defense work, amounted to approximately $61.4 million through December 31, 1958.

R–W contracts for the design, development, production or servicing of end items

In recognition of the need for special precautions in order to promote a greater degree of objectivity on the part of the technical director in advising the Air Force on technical matters which may naturally affect other industrial contractors, and to facilitate acceptance of technical decisions by the contractors working in the program, an unusual clause was placed in the R–W/STL contracts. This clause, contained in the initial definitive contract, AF 18(600)–1190, read as follows:

> The contractor agrees that due to its unique position in the administration and supervision of the program contemplated hereunder, the Ramo-Wooldridge Corp. will not engage in the physical development, or production of any components for use in the ICBM's contemplated herein, except with the express approval of the Assistant Secretary of the Air Force (Materiel) or his authorized representatives.

Similar restrictions appear in subsequent contracts.

While as a result of this prohibition direct competition between R–W/STL and the contractors in the ballistic missile program was generally precluded, R–W engaged in substantial amounts of design, development, production, and servicing of end items in closely related fields.

Contracts and subcontracts awarded by the Air Force, the Army, the Navy, and various contractors to R–W/STL from its inception through December 31, 1958, for the design, development, production, and servicing of end items, as distinguished from technical studies, amounted to approximately $61.4 million, as shown below:

	Amount in millions
Prime contracts:	
Air Force	$35.9
Army	14.0
Navy	.6
Subcontracts under Defense Department prime contracts	10.9
Total	61.4

The work called for in these contracts and subcontracts in general was not specifically under the ballistic missile program but did involve work in closely related fields, such as design of hardware for lunar and space probes and development or production of a direction finder system, an infrared seeker, an airborne digital computer, and a telemetry data converter and data checker.

The following instances illustrate the close relationship of the work performed by R–W/STL under these contracts with its efforts in

systems engineering and technical direction of the ballistic missile program.

1. R–W/STL received an Air Force prime contract amounting to $4,281,400 for the design and development of a vehicle capable of lunar flight. The payload, known as the Pioneer, was designed and produced by R–W/STL and used in three lunar probe flights. The Thor IRBM which was used as the first stage of these vehicles was developed and the launchings were performed under the technical direction and systems engineering of R–W/STL. All components of the payload, including instrumentation, were produced by R–W/STL. Hardware modification responsibility was also assigned to R–W/STL for the second, third, and payload stages which were added to a Thor IRBM to complete the vehicle.

2. A subcontract was awarded to R–W/STL for production of hardware in connection with the Titan program. The American Bosch Arma Corp., an associate contractor responsible for the all-inertial guidance system for the Titan, awarded a subcontract approximating $800,000 to R–W/STL for design and fabrication of data processing equipment, including spare parts. Arma had solicited 18 companies for bids on this work and had received two proposals, one of which was from R–W/STL. The R–W/STL proposal was considered by Arma to be technically superior and lower in cost. The Commander, BMD, approved award of the subcontract to R–W/STL on the basis that it "* * * is in no way related to the number of missiles produced and has no production follow-on, being a one-time design and fabrication job" and, therefore, did not conflict with the intent of the ballistic missile hardware prohibition.

3. With approval of the Secretary of the Air Force, R–W/STL was awarded a contract by Rome Air Development Center in the amount of $18.6 million for the development and production of the intelligence data-handling system for a military reconnaissance satellite program known as the WS–117L. The WS–117L reconnaissance system is composed of the satellite vehicle, the booster, launch facilities, tracking facilities, and a complex communication and data processing network. Lockheed Aircraft Corp. is the weapons system contractor for the WS–117L, and R–W/STL is not responsible for technical direction of this program. R–W/STL was selected after an Air Force evaluation of proposals by it and three large industrial corporations resulted in a determination that the R–W/STL proposal was clearly superior.

DOES STL DUPLICATE EFFORTS OF PRIME CONTRACTOR OR AIR FORCE?

"(8) *Explain the relationship of the prime contractor for a long-range ballistic missile to the function of the Space Technology Laboratories. What do the STL personnel contribute that does not overlap and duplicate the efforts of the prime contractor or the Air Force staff?*"

Summary

Our limited examination during the initial phase of our review of the Air Force ballistic missile program did not disclose unwarranted duplication or overlapping of effort between STL and the contractors participating in the program. An Air Force internal evaluation dis-

closed indications of duplication of effort between STL and the Air Force, but such duplication is reported to have been minor.

STL relationship to contractors

The research and development and production phases of the Air Force ballistic missile program are conducted by the associate contract method of procurement. Under this method of procurement, each of several contractors holds a prime contract with the Air Force to accomplish a major subsystem or portion of the weapons system, such as (1) weapons system engineering and technical direction, (2) airframe and missile assembly, (3) propulsion, (4) guidance, or (5) reentry vehicle.

If an Air Force ballistic missile program were conducted under a single prime weapons system contract, the functions of weapons system engineering and technical direction would normally be assigned to the weapons system contractor and other functions would usually be performed either by the weapons system contractor or by a subcontractor responsible to him. In view of the complexity and urgency of the ballistic missile program, the Air Force did not assign responsibility for development and production of the entire ballistic missile system to a single contractor. Inasmuch as the Air Force felt that it did not have the in-house capability to technically direct the ballistic missile program, it assigned the responsibility for systems engineering and technical direction to an independent contractor, R–W (now STL).

The other associate contractors responsible for development and production of "hardware" are contractually required to look to STL for systems engineering and technical direction in the same manner as a subcontractor looks to a weapons system prime contractor for the same functions. Important differences are that (1) no contract exists between STL and the other associate contractors, and (2) STL may not produce any of the missile hardware for these programs under its direction.

STL is responsible to the Air Force for keeping the programs on schedule technically and for adequacy of overall weapons system technical performance, in accordance with objectives specified by the Air Force. This encompasses the definition of overall weapons systems design characteristics, the determination of subsystem technical specifications, the assurance of compatibility of the subsystems, and the establishment of an integrated plan for research and testing.

Each associate contractor has the responsibility to the Air Force to design, develop, and produce its particular subsystem to STL specifications, to perform in-plant test of its subsystem, and to deliver it on schedule to the contractor responsible for installation into the missile. The guidance contractor is in no way responsible for insuring that its adherence to the specifications provided it for its subsystem will enable the complete missile to meet overall weapons systems requirements of range, accuracy, payload, etc. Similarly, the propulsion contractor is concerned only with design of the engine to the specifications that have been provided it and is in no way responsible for effects upon missile accuracy, upon missile vibration or bending, upon airframe structural integrity, etc., which the specified performance of the propulsion unit might possibly cause. The airframe contractor's responsibility is similar to that of the other associate contractors but, in addition, includes the physical assembly or installation of all subsys-

tems, the physical test of the complete missile, and the delivery of the assembled missile to the Air Force.

STL performs as systems engineer and technical director of the Air Force ballistic missile program in a "line" capacity for BMD as its civilian technical staff. STL's specific functions in this respect have been described by the Air Force, as follows:

(*a*) Preparation of subsystem work statements and general specifications for propulsion, guidance, airframe, ground support equipment, reentry vehicle, etc., for a specific weapon system such as Atlas, Thor, Titan, or Minuteman. (These work statements and general specifications are reviewed and approved by the Air Force before being placed on contract.)

(*b*) Establishing and maintaining control of specific technical interface specifications and, in some cases, providing interface control drawings between subsystems.

(*c*) System and subsystem analysis (including experimental and computer-performed simulation) as necessary to carry out systems engineering for a specific weapon system. This analysis includes stability analysis of the complete missile, trajectory formulation, error analysis of the complete system, including guidance, nose cone, geophysical target location errors, etc.

(*d*) Specific technical direction of all associate contractors to insure that their efforts meet the specifications provided initially, and to insure that rapid modifications are made in all subsystem specifications when necessary to reflect a change in the specifications for, or in the results obtained from, another given subsystem. * * *.

(*e*) Preparation of general test plans for captive and flight testing.

(*f*) Preparation of a specific document entitled "Detailed Test Objectives" for each missile flight. This document includes the results of any refereeing necessary between subsystems regarding telemetry channel allocation, formulation of test trajectories, etc.

(*g*) Technical supervision of captive and flight test technical operations conducted in the field by associate contractors.

(*h*) Preparation of acceptance test specifications for all subsystems, for use in accepting the propulsion, guidance, and reentry vehicle subsystems at the associate contractors' plants, and preparation of acceptance test specifications for the assembled missile after the subsystems have been delivered to and assembled by the integrating contractor for delivery to the Air Force. Actual acceptance of the hardware is made by the Air Force upon receipt from STL of a statement that the hardware in question satisfactorily meets the acceptance test specifications, or deviates from it in a prescribed but acceptable manner.

(*i*) Evaluation and reduction of flight test data in coordination with associate contractors, leading to decisions concerning modifications, if any, required in flight hardware prior to succeeding flights.

(*j*) Scheduling development program delivery of all subsystems to the integrating contractor, scheduling of assembled missiles to the test ranges, and assuring noninterference between ballistic missile flight tests. These schedules are included in a formally prepared development plan and are directive only when approved and countersigned by appropriate Air Force representatives.

(*k*) Issuance as necessary of formal "Technical Directive" to all associate contractors. Such technical directives become contractually binding documents, including Air Force commitment of funds to the contractory, when approved and countersigned by appropriate elements of the Air Force staff. * * *.

(*l*) Formulation and specification to all associate contractors of subsystem environmental test specifications and reliability specifications, and review of associate contractor test programs and results to insure that their individual subsystems are in fact so tested and do meet such specifications.

(*m*) Conduct of laboratory research and experimental work to aid in making valid system engineering decisions and judgments. * * *.

(*n*) Planning and conducting experimental flight projects with the objective of gathering new scientific data and aimed at demonstrating the validity of advanced theories, techniques, and/or designs of equipment. * * *.

Insofar as we could determine in our limited examination during the initial phase of our review of the ballistic missile program, STL

efforts in carrying out these functions do no unnecessarily duplicate work being performed by the associate contractors.

STL relationship with Air Force

The Air Force retained overall weapons system responsibility and direction in connection with the ballistic missile program, while R–W/STL was assigned responsibility for technical direction and systems engineering for the program. In practice, these responsibilities have been carried out by BMD and STL personnel in the same facilities, with STL personnel acting in a "line" capacity for BMD as its civilian technical staff.

This close relationship is illustrated by the role STL plays in connection with the associate contractors. When a new job has been decided upon, STL prepares a preliminary job statement while the Air Force prepares a preferred contractors list. The contractors on the preferred contractors list are invited to a prebid briefing where the work to be done is explained by STL and the proposed schedules are clarified by STL or BMD. The contractors then prepare proposals and bids. BMD selects the contractor with the aid of a technical evaluation by STL of prime and subcontractor proposals. STL, with the consultation of the Air Force, prepares a work statement which may be issued to the contractor as part of a letter contract. The work statement defines the nature of the work to be performed, in technical terms and on the basis of the best judgment of the time, as supported by the preliminary job statements, the proposal, and discussion with the contractor.

Following the selection of the contractor, STL is responsible to the Air Force to insure that technical milestones objectives are met on schedule. Frequent meetings are held by STL personnel with the contractors to review the progress of the work and to attempt to resolve problem areas. Minor matters may be resolved informally by the STL representative and the associate contractor. Major decisions are recorded in technical directives prepared by STL and approved by BMD. These technical directives are contractually binding upon the associate contractors.

An Air Force study dated July 1958, entitled "Management Improvement Possibilities in the AFBMD Complex," reported as follows with respect to problems that had arisen in the joint operations of Air Force and STL at the BMD Complex:

> Problems have arisen from the complexity and size of the AFBMD task. The tempo of operations, the compression of work into ever-tightening schedules, the changes and modifications to weapons, subsystems and facilities—all have combined to create different interpretations of function and relationship. The place where the majority of these differences occur is naturally at the meeting place of the independent members of the complex, i.e., the interface.
>
> An essential element in the successful operation of the complex during the past several years has been the contractual relationship with STL. By means of the STL contract, the Air Force and BMD have, as intended, been able to obtain the services of a well-qualified technical organization, capable of accomplishing the difficult task of system engineering and technical direction for complex ballistic missile systems on a crash schedule. A thorough understanding of the nature and elements of the contractual relationship between BMD and STL is essential to a discussion of the interface between STL and BMD, and in turn to a discussion of possible duplication or overlapping of functions.
>
> In addition to other managerial duties, it is the responsibility of BMD to insure that the STL system engineering and technical direction is, in fact, aimed at meeting Air Force operational requirements in a thorough and expedited manner.

From the BMD viewpoint it is necessary to maintain relationships with STL which enable BMD to provide direction to the STL effort, while at the same time not eroding the basic contractual relationship which is fundamental to the operation of the entire complex.

From the STL viewpoint, the STL must organize so that STL can receive the direction from BMD, while at the same time retaining the favorable environment which enables STL to assemble and maintain the topflight technical staff for the system engineering and technical direction task.

The committee has discussed questions relating to this interface at some length. In examining the relationships between WDT [5] and STL, "closeness of association" should not be allowed to obscure the need for "clearness of function." The functions of WDT and STL are quite different; the WDT function is primarily *managerial*, while the STL function is primarily *technical*. While these two functions are rather easily separated in the performance of "systems engineering," a very high order of WDT/STL cooperation is required in accomplishing the function of "technical direction." Detailed examination of some of the recent instances in which it was necessary to sort out and adjudicate apparent duplication and confusion between elements of STL and elements of WDT indicates that in large part, the problems have arisen because of the fact that WDT and STL individuals new to the complex were not made aware of the detailed relationships which have evolved during the past several years at the working level between the WDT and STL groups. This points to a clear need for a systematic indoctrination of new BMD and STL individuals so that they understand the difference in the functions of WDT and STL at the outset.

If one places oneself in the position of an STL project engineer several echelons down in the organization, and draws a simple diagram showing the pattern of "counterparts" on the two sides of the WDT and STL interface, it is readily apparent that the STL project engineer can be receiving inputs from the top of the organization along a very large number of different communication channels. The committee noted a considerable amount of confusion concerning the proper manner for communication across this interface, again particularly on the part of individuals new to the complex. Since the close and intimate communication channels have in the past proved highly beneficial to both WDT and STL in carrying out their assigned functions, there is no desire to weaken this communication, but rather to define its nature more specifically; *there is a need to distinguish between "information" channels, and "action" channels.*

It is essential to the STL management in directing the work of STL that the STL organization does in fact meet its contractual obligations to BMD as an organization; that the assignment of tasks to STL employees, supervision of the work of individual STL employees, allocation of priorities for work in several groups, initiation and determination of specific tasks, etc., be firmly under the control of the STL management. Only in this way, of course, can STL be responsible to BMD for the system engineering and technical direction task. (An exception to this statement is found in the area of direct Air Force support where the STL contractual obligation is simply to supply a certain number of employees for direct supervision by BMD.)

There is no question of STL's role in systems engineering and technical direction. Currently, however, STL is staffing problem areas, making recommendations for their solution and presenting these solutions to the associated contractors for action without full coordination and prior approval of BMD program directors. Here is an apparent fundamental problem in the interpretation of STL's role. On the other hand it is felt that STL must take action without full coordination because of the exigencies of the situation, absence of BMD program director, etc., and that this is within the meaning and scope of the contract. On the other hand there is the feeling that BMD is not always consulted when it could have been. The solution here seems to be to spell out the management relationship *in the contract* in greater detail, as well as to develop mutually satisfactory methods of operation in which the BMD/STL functional relationship is clearly agreed upon.

None of these points appear to be serious. They do not present any major problems. Yet, in the interest of effective management, the committee feels that positive action should be taken to clarify the BMD/STL relationship.

---

[5] WDT, an organization in the Air Force Ballistic Missile Division.

We were informed that this study was a self-critical evaluation of areas of potential difficulty and that the problems of duplication of effort and confused channels of communication and/or direction which had been encountered were minor in the context of the overall ballistic missile program. We were informed also that action had been taken to correct these weaknesses. Our limited review did not disclose any additional instances of overlapping of activities between STL and the Air Force.

CONTRACTORS' PRACTICES OF SPREADING COSTS OVER SEVERAL CONTRACTS

"(*a*) *Cost-plus contracting procedures have resulted in practices by contractors of spreading costs over several contracts. The committee would like to know the reasons for this practice, approximately the extent to which it is being used, the degree of controls over items of cost, including personnel, and the effect of these practices on renegotiation of the contracts.*"

At a meeting on June 24, 1959, with staff members of the subcommittee, we were informed that the subcommittee was interested, in connection with this item, in obtaining specific examples of staffs developed under Government contracts but subsequently absorbed by the contractor's organization and their skills and knowledge used by the contractor to develop new programs and items to be sold to the Government. The subcommittee was particularly concerned with the activities of R–W in the Air Force ballistic missile program. We were requested to furnish names of individuals who formerly worked for R–W in the Air Force ballistic missile program, acquiring special knowledge of Air Force program requirements, and subsequently moved with R–W when it merged with Thompson Products, Inc.

We were also informed that the subcommittee was interested in learning whether or not there were areas of work performed under the R–W contract that approached a near breakthrough in development that could later be sold to the Government by Thompson Ramo Wooldridge, Inc. In this connection, information was requested as to what plans and files may have been taken to TRW when R–W separated from the ballistic missile program.

Summary

From the inception of R–W in September 1953 to its merger in October 1958 with Thompson Products, Inc., its operations were predominately under cost-type contracts with the Government and its major activity was in connection with the Air Force ballistic missile program. The R–W staff grew rapidly during this period from 18 persons in 1953 to 4,384 in October 1958. When STL was established as a separate subsidiary corporation and R–W merged with Thompson Products, the staff previously acquired by R–W under Government contracts was split between STL and TRW. Eleven of the 14 top executives were transferred to TRW, while 3 remained with STL. Approximately three-fourths of the technical staff also remained with STL.

All classified documents involving the ballistic missile program in possession of R–W personnel had been, or were being, returned to the Air Force following the merger, with the exception of 23 documents retained by TRW with Air Force approval for use in processing patent applications. The substantial number of patent dis-

closure [6] made by R–W prior to separation from the ballistic missile program indicates the future potential value of the know-how and capability it acquired under Government contracts. These contracts, with the exception of those pertaining to work for the National Aeronautics and Space Administration, provide that the Government shall receive a royalty-free license to practice or have practiced any inventions conceived or first actually reduced to practice in the course of performing the contract work. However, title to the inventions is vested in R–W/STL.

Allocation of costs to Government contracts

Generally, the total cost of a cost-reimbursement-type contract consists of the allowable direct costs generated in the performance of the contract and the properly allocable portion of allowable indirect costs, less applicable income and other credits. As defined in ASPR 15, part 2, allowable direct costs are the costs of materials, labor, and other costs which are incident to the performance of the contract. These costs, which are readily identifiable with the end product or are consumed directly in connection with furnishing such products, are charged directly to the particular contract and cannot be spread over several contracts. On the other hand, indirect costs are those items not identified with the performance under an individual contract but are incident to the contractor's operations without regard to a specific contract. These costs are apportioned to all contracts currently being performed within the contractor's plant, subject to the limitations described in ASPR 15, part 2.

It is the basic responsibility of the contractor to allocate all costs, whether direct or indirect, on a fair and equitable basis to all of its business, including Government contracts. The costs allocated must be applicable, as well as reasonable, to the product being procured under the particular contract. To assure that these costs are properly allocated to Government contracts, audits are made by representatives of the military audit agencies. These audits of CPFF contracts involve a review or survey of the contractor's accounting systems, practices, and controls, and the audit and certification of reimbursement claims. The General Accounting Office makes selective reviews of these contract activities with appropriate recognition of the controls and audits provided by the administrative agency.

Inasmuch as our authority does not extend to actions taken by the Renegotiation Board, we could not appraise the effect of these practices on renegotiation of the contracts.

Information as to R–W staff developed under Government contracts and transferred to TRW

R–W's operations since its inception in September 1953 to the merger on October 31, 1958, with Thompson Products, Inc., have been predominately under cost-type contracts with the Government. The major portion of this activity has been in connection with the

[6] A patent disclosure is a descriptive written statement required to be furnished by a contractor to the contracting officer for an invention or discovery conceived or first actually reduced to practice by its employees while performing experimental, developmental, or research work under the contract. To protect the Government's interest in receiving a royalty-free license to practice or have practiced any such inventions, the standard patent rights clause prescribed by sec. 9–107.2 of the Armed Services Procurement Regulation provides that, for each such invention which reasonably appears to be patentable, a prompt disclosure shall be made, together with a statement specifying whether or not a patent application has been or will be filed.

Air Force ballistic missile program. The R–W staff assigned to the BMD complex grew rapidly during this period, as shown below:

	Number
Dec. 31, 1953	18
Dec. 31, 1954	281
Dec. 31, 1955	1,156
Dec. 31, 1956	2,657
Dec. 31, 1957	3,269
Oct. 31, 1958	4,384

R–W personnel directly involved in the ballistic missile program were as follows:

	As of Dec. 31—				As of Oct. 31, 1958
	1954	1955	1956	1957	
Member technical staff	65	217	441	616	970
Technical support	45	150	256	423	
Air Force support	18	117	247	277	1,800
Administrative	42	276	613	645	
Total	170	760	1,557	1,961	[1] 2,770

[1] This is staff transferred to STL after its separation from R–W.

Upon the establishment of STL as a separate subsidiary corporation and the merger of R–W with Thompson Products, Inc., the staff previously acquired by R–W under Government contracts was split between STL and TRW. Eleven of the 14 top executives were transferred to TRW and 3 were assigned to STL, as shown below:

Name	R–W position before merger	Position after merger	
		STL	TRW
D. E. Wooldridge	President		President.
S. Ramo	Executive vice president		Executive vice president.
H. L. George	Senior vice president		Vice president.
I. A. Binder	Vice president		Do.
L. G. Dunn	do	President	
R. P. Johnson	do		Do.
R. F. Mettler	do	Executive vice president	
B. F. Miller	do		Do.
M. E. Mohr	do		Do.
V. G. Nielsen	Vice president, secretary and treasurer.		Do.
G. P. Saville	Vice president		Do.
G. F. Fennimore	Assistant vice president		Staff.
R. B. Corpening	Assistant secretary		Assistant secretary.
S. E. Gates	do	Director	

NOTE.—Of the above-named executives, Drs. Dunn and Mettler had been assigned to the STL division of R–W prior to its separation from R–W. In addition, Dr. Ramo had been appointed an officer of STL when it became a separate division of R–W and had devoted approximately 80 percent of his time to STL prior to Oct. 31, 1958.

The assignment of personnel to STL and TRW following the merger is summarized below:

	Before merger, R–W Corp.	After merger	
		STL	R–W
Total personnel	4,384	2,770	1,614
Members of technical staff	1,311	970	314

Disposition of ballistic missile documents held by R–W personnel transferred to TRW

When R–W was merged into TRW, action was taken by the Air Force and contractor officials to insure the return of all classified documents held by R–W personnel. In view of the relatively few unclassified documents involved in the program and the lack of records showing the distribution of such documents, emphasis was placed on the return of classified documents. At the time of our review in June 1959, all classified documents involving the ballistic missile program in the possession of R–W personnel had been or were to be returned to the Air Force, with the exception of 23 documents. These documents were retained by TRW with Air Force approval for use in processing patent applications which TRW stated had been pending before the establishment of TRW.

Potential use of knowledge gained by R–W under Government research and development contracts

While, as stated previously, classified documents involving the ballistic missile program that had been acquired by R–W personnel were in general returned to the Air Force when R–W separated from the program, the know-how and capability gained by these individuals obviously were retained by them for use in future endeavors. Recognition of the value of the know-how and capability acquired by R–W is shown in a letter dated September 3, 1958, from the chairman of the board of Thompson Products, Inc., to stockholders, proposing the merger, which stated:

> If the company is to continue to grow we must move even more aggressively into the newer markets that serve the needs of the advancing age. Because there is an ever-increasing emphasis on missiles and aeronautics in the budget for national defense and because Ramo-Wooldridge is strongly entrenched in these fields and in a position to make very important contributions to our production capabilities in commercial as well as military areas, it appears desirable to effect the combination of the two businesses at this time.

The substantial number of patent disclosures made by R–W prior to separation from the ballistic missile program and subsequently made by STL is further evidence of the future value of the know-how and capability acquired under Government contracts.

The Air Force contracts with R–W/STL, with the exception of those negotiated for the National Aeronautics and Space Administration (NASA), contain the standard clause covering patent rights prescribed in ASPR 9–107. However, the NASA contracts contain special provisions whereby title to inventions resulting from work done by R–W/STL in the space program is retained by NASA. As a condition of employment, R–W/STL employees have been required to assign to R–W/STL any inventions, developments, and discoveries made or conceived during the period of their employment. Inventions conceived through October 31, 1958, the date of the merger of R–W with Thompson Products, Inc., and the separation of STL, are considered the property of TRW, even though they were disclosed subsequent to that date. Inventions conceived subsequent to the establishment of STL are the property of STL.

Many valuable patent disclosures by TRW arising from work under Air Force contracts

As of June 30, 1959, 218 patent disclosures had been made by the employees of R–W Division, TRW, arising from work under Govern-

ment contracts—192 disclosures were developed under Air Force contracts and 26 were developed under other Government contracts. In connection with the 218 [7] disclosures, 62 patent applications were filed, 2 of which have been granted; 33 applications were approved for filing; 57 disclosures were under evaluation; and 3 were awaiting evaluation. The remaining 62 disclosures were in an inactive status.

We were informed by the patent counsel of the R–W Division, TRW, that patent applications are not filed for all inventions that are disclosed. Patent applications are filed for disclosures which have potential commercial benefit and, in some instances, patent applications are filed for morale purposes, i.e., to provide recognition of the inventor. We were informed, however, that patent applications are not filed for inventions that have only military applicability. Also, we were advised that some patent applications were not filed because the inventions may have been made from information obtained in the course of work with ballistic missile program associate contractors, and that such items and inventions with military application only are included among the inventions classified as inactive.

We were informed by the contractor that it could not determine the future value of the patents obtained or applied for as a result of the Government contract work. However, the following information obtained from TRW indicates that in its opinion the value is substantial. TRW classifies inventions as follows:

DEFINITIONS OF IMPORTANCE CLASSIFICATIONS

Numeral

1 *Primary.* Relates to a development believed to be sufficiently basic and important to provide a basis for a new industry or an entirely new product line; or one which may have a major effect on the expansion or conversion of an existing industry or product line.

2 *Secondary.* Relates to a development which is part of an important commercial or patent position (e.g., one of several developments relating to a major commercial program or to an active patent licensing program); or which offers the possibility of obtaining enforcible patent protection for a particular product as to which commercial use is definitely predictable.

3 *Speculative.* Relates to a development which offers the possibility of obtaining patent protection of substantial or broad scope, but whose use or importance is not yet definitely predictable.

4 *Marginal.* Relates to a development believed to be of minor importance or of marginal patentability, but which still justifies patent consideration for some special reason (e.g., to provide recognition of the inventor, or to provide insurance against patenting by competitors).

TRW has rated, as follows, the 62 disclosures for which applications have been filed and the 33 which were approved for filing as of June 30, 1959:

Primary	11
Secondary	69
Speculative	13
Marginal	2
Total	95

STL also has made valuable patent disclosures under Air Force contracts

Twenty-two patent disclosures were made by STL employees under Air Force ballistic missile contracts during the period from November 1, 1958, to June 30, 1959.

[7] Two of these disclosures were combined into a single patent application.

STL uses the following rating system for classifying its inventions:

1. Basic invention, foundation of a new industry or product line.
2. Probable widespread use by STL or others.
3. Speculative, probability of some use by STL or others.
4. Marginal, low probability of use by STL or others.

The 22 patent disclosures under Air Force ballistic missile contracts through June 30, 1959, were rated by STL as follows, showing their potential value:

Rating:	Number
1	1
2	8
3	11
Inactive	2
Total	22

As of June 30, 1959, two patent disclosures also had been made by STL employees in connection with work performed for NASA under contracts negotiated by the Air Force. We have been informed that the patent rights to these patent disclosures are owned by NASA. STL objected strenuously to the inclusion of the NASA patent clause in view of the loss of patent rights to inventions made in performance of the work under these contracts. STL increased its fee proposal for contract AF O4(647)-302 from $760,500 to $855,200 in view of the loss of patent rights and the administrative load caused by the NASA regulations covering documentation requirements. The fee finally negotiated for this contract was $714,107. While the amount included in the negotiated fee specifically for the loss of patent rights is not known, it is evident that STL estimated the value of such rights, together with the attendant paperwork, at $94,700.

Contractor comments

STL, in commenting on our report draft, pointed out that its patent position is the same as that of any contractor engaged in any program for the Department of Defense. STL stated that application of a clause requiring that the Government take title to patents would—

> * * * have the effect of driving many companies whose contributions are important out of the program because they simply could not afford to abandon their ownership of the commercial rights in inventions which they conceived. Hence, we believe that if this clause were applied to all ballistic missile contractors it would have a very serious harmful effect upon the ballistic missile program. If, on the other hand, this clause were applied only to companies having systems engineering and technical direction responsibilities for weapon system development programs, we believe that the effect would be ultimately to deny the Government the contributions of those companies most qualified to assume such responsibilities.

PARALLELISM AND MULTIPLE APPROACH

"(b) *Our committee noted that the publicly announced policy of the Defense Department, insofar as missile production is concerned, is one of parallelism and multiple approach. It would appear that with this approach there is reason to suspect unwarranted duplication in missile plans, components, and testing, either within the Federal Government, as between Defense contractors and the Federal Government, or among Defense contractors.*"

Summary

The blastic missiles included in our review—Atlas and Titan ICBM's and Thor and Jupiter IRBM's—illustrate the multiple and parallel approach which has been authorized in the ballistic missile program. These duplications were made deliberately by the Department of Defense to provide greater assurance of success and to act as a stimulus toward accelerated progress, and frequent reviews were made to determine whether sufficient reliability had been obtained to warrant elimination of the duplicate system. While these duplications may have been warranted in view of the urgent requirements, we believe that the duplication of effort by scientific engineering and technical personnel in pursuing alternate approaches within these programs could have been reduced through prompt exchange of technical information developed in these programs.

Atlas-Titan

The Atlas, a liquid-propelled intercontinental ballistic missile, had been under development since 1951 and was accelerated in early 1954. The Titan, also a liquid-propelled ICBM, started as a backup to the Atlas in late 1954. Both programs have continued for more than 5 years, with vast expenditures of funds and manpower, and further development and production is scheduled for years to come. While the two ICBM's are not identical in configuration, their missions and capabilities are essentially the same. They utilize different contractors for the airframes, propulsion systems, nose cones, radio-inertial guidance systems, and all-inertial guidance systems. Thus, there obviously has been, and will continue to be, a considerable amount of duplication in the components, testing, facilities, and personnel required to carry out these two programs.

Thor-Jupiter

Similarly, the Thor and Jupiter intermediate range ballistic missiles were authorized for simultaneous development to improve the chances of success. These programs were authorized in late 1955, and development and production has continued to date. The missiles are now reported to be operational, and production is being phased out. Considerable amounts have been spent in connection with these programs and substantial duplication of components, facilities, and personnel has been involved.

These duplications in missile programs and components were made in the endeavor to assure that a successful missile system would be available at the earliest possible date. Frequent reviews of these ICBM and IRBM programs were made by scientific and technical committees to determine whether sufficient reliability had been obtained to warrant eliminating the duplicate system. However, none of these programs were canceled.

Technical information not exchanged promptly

While duplication within the Atlas-Titan ICBM programs and the Thor-Jupiter IRBM programs may have been warranted in view of the urgent requirements and the lack of assurance that a satisfactory weapon could otherwise be obtained, we believe that the duplication of effort by scientific engineering and technical personnel in pursuing alternate approaches within these programs could have been reduced

through prompt dissemination by the military service of technical information developed in work under these programs.

The Air Force delayed the release for substantial periods of time of essential documents requested by the Army and Navy. In addition, certain documents were withheld by the Air Force on the grounds that such documents involved contractors' proprietary information, preliminary studies, inconclusive findings, or internal Air Force administrative affairs or that they could not be released due to security restrictions. However, cooperation is reported to have improved recently.

On November 8, 1955, the Secretary of Defense established separate development programs for the ICBM and IRBM. The ICBM and the IRBM No. 1 (Thor) programs were assigned to the Air Force, while the IRBM No. 2 program (Jupiter and, subsequently, Polaris) was assigned to the Army and Navy. The Secretary of Defense declared that it was the objective of the Department of Defense that the ballistic missile research and development programs be carried out "at the maximum rate technology will permit." Accordingly, he stipulated that—

> Not only is maximum technical and managerial coordination between the two IRBM programs essential, but maximum coordination among all of the ballistic missile programs is required.

The Department of Defense directive was implemented by the Air Force in November 1955 in its plan for simplifying administrative procedures for the ICBM and IRBM programs. The Office of the Chief of Staff, U.S. Air Force, directed the major organizational elements in the management structure of the Atlas and Thor programs to coordinate with their counterparts in management structures of the Jupiter program to establish effective liaison for the exchange of information and the resolution of interrelated problems.

Army and Navy liaison offices were established at the Air Force Ballistic Missile Division, and the Air Force liaison offices were established at the Army Ballistic Missile Agency and the Navy Special Project Office early in 1956. In addition, procedure was established for surveying project and liaison offices and other Government agencies to determine the required number of copies of contractors' reports so that automatic distribution could be made when the reports were received at the Air Force Ballistic Missile Division. Also, a report was published periodically listing all reports available for distribution at the Air Force Ballistic Missile Division. This listing has wide dissemination to ballistic missile contractors and other Government agencies. Furthermore, Air Force Ballistic Missile Division associate contractors were authorized to furnish to each other, or to subcontractors, any report required by their contract after determining that the recipient had a need to know the information.

While numerous reports are distributed automatically to the Army and Navy, a large percentage of the technical documents and reports furnished them were obtained by specific requests, based on the periodic reports which list the documents available for distribution. Analysis of the January 26, 1959, report disclosed that the majority of the documents listed had been issued 2 or 3 months earlier.

We determined that an average of 65 days was required for the Air Force Ballistic Missile Division to furnish technical documents and reports specifically requested by the Army and Navy liaison offices.

During our review, we scheduled 647 documents which had been requested by the Army liaison office and found that an average of 66 days had elapsed before these documents were furnished by the Air Force Ballistic Missile Division. We reviewed 120 documents which had been requested by the Navy liaison office and determined that 60 days had elapsed before receipt of these documents by the Navy. Thus, these reports generally were not released until 4 to 5 months after date of issue.

The following examples illustrate the delays encountered by the Army and Navy in receiving documents requested from the Air Force Ballistic Missile Division:

1. On July 3, 1957, the Army liaison office requested these two reports:

(*a*) DAC Report SM27165, "IOC Equipment List"; and

(*b*) DAC Report 27248, "Detailed Test Plan for Sacramento."

The Air Force Ballistic Missile Division refused to furnish these documents. The reason for the refusal was stated to be that it had been determined that the documents were not releasable in view of the proprietary information contained therein which might compromise the commercial interests of the originating agency.

The Army liaison officer informed us that these reports would have been of value to the Army Ballistic Missile Agency in determining the applicability of selected items of Thor equipment to the Jupiter system. Further, since the Air Force planned to use Sacramento to test out one complete set of Thor ground support equipment, the test plan for that site would have been valuable as an indication of the type of contractor tests desired by the Air Force prior to delivery of the equipment.

The Commanding General, Army Ballistic Missile Agency, protested the Air Force Ballistic Missile Division's refusal to the Special Assistant for Guided Missiles, Office of the Secretary of Defense, on October 10, 1957. On May 7, 1958, slightly over 10 months after the original request, the reports were received by the Army Ballistic Missile Agency.

2. On April 3, 1959, the Army liaison office requested certain documents concerning the Minuteman ballistic missile. The Air Force Ballistic Missile Division, on April 23, 1959, refused to release four reports, stating that the reports were not available for distribution for a period of 6 months after the date of issue.

Maj. Gen. John Medaris, commanding general, U.S. Army Ordnance Missile Command, in his testimony on March 2, 1959, before the Military Operations Subcommittee of the Committee on Government Operations, House of Representatives, stated that the Air Force Ballistic Missile Division delayed and, in some cases, refused to supply technical information to the Army.

The Commander, Air Force Ballistic Missile Division, denied that the Air Force did not cooperate fully with the Army. He stated that a huge quantity of documents (4,476) had been furnished to the Army and only 28 requests were declined. He stated that his action in these instances was based on the grounds that such documents involved contractors' proprietary information, preliminary studies, inconclusive findings, internal Air Force administrative affairs, or could not be released in accordance with security restrictions.

General Medaris, in a memorandum for the record dated May 26, 1959, which was forwarded to the subcommittee, again stated that the

supply of information from AFBMD was not free and open. He reported that there was a continuous struggle to obtain information and that the normal waiting period was from 60 to 75 days, if the request was not contested.

With respect to the Air Force statement that only 28 documents were denied, General Medaris pointed out that "it is not the quantity, but the quality and timeliness of the technical information that is the major issue." He cited a Convair report which was refused because it was an "internal document, therefore not releasable." This report concerned radiant heating from engine exhaust gases. He said that this type of heating problem was of particular significance to the Jupiter program at a later date.

As stated above, the Air Force advised that 28 documents requested by the Army were withheld. Our review disclosed 15 additional refusals of Army requests and two instances where reports were denied to the Navy liaison office.

One of the requests refused was for the R–W/STL monthly and semiannual technical reports. The reason given by BMD for refusing the Army was that these reports contained internal management information. The reasons for refusing the other reports were that they included proprietary information, internal management information, etc.

SUPPLEMENTAL PAYMENTS TO CONTRACTOR EMPLOYEES AT DOD TEST FACILITIES

"(*c*) *Our examination revealed that at one Defense activity, Holloman Air Force Base, Alamogordo, N. Mex., employees of cost-plus-fee contractors were paid per diem allowances varying from $8 to $15 per day. This action has often proved a negative factor on the morale of Government personnel, without the per diem allowances but working alongside of the contractor's employees. It is also a factor among contractor employees who realize that they are not getting the same consideration under similar circumstances. In raising the question, we feel that this personnel practice may be pertinent to other places, and therefore, the overall policy and procedures are of sufficient interest for more complete development.*"

Summary

A revised policy has been established by the Department of Defense covering supplemental compensation to contractor employees at Cape Canaveral, Fla., and Edwards Air Force Base, Calif. Contractors with employees at these locations have been instructed to discontinue payment of supplemental compensation after June 30, 1960. Similar changes at other test locations are being considered. The Armed Services Procurement Regulation Committee, Office of the Secretary of Defense, is considering a proposed revision to the ASPR covering contractors' employees at isolated locations.

Actions taken to resolve problem of varying allowances

As stated in our report dated October 21, 1959, concerning this item, this office, prior to the request from the subcommittee, had made a study of supplemental payments to contractor employees working at Edwards Air Force and Rocket Bases, Calif. We found that travel allowances were paid to contractor employees although the factors of

isolation and unfavorable environment, which originally justified such payments, were no longer present.

We reported our findings to the Department of the Air Force, which recommended to the Office of the Secretary of Defense (OSD) that a study group be established to investigate the practice and determine the feasibility of establishing new standards and conditions for payment of incentives to contractor personnel. At the time of our report to the subcommittee, this study group had completed a preliminary review and the staff of the Assistant Secretary of Defense (Supply and Logistics) was considering the problems disclosed, particularly at Cape Canaveral, as the basis for development of a policy position.

Subsequently, we were informed that OSD had completed its study of the conditions at Patrick Air Force Base, Cape Canaveral, Fla., and Edwards Air Force Base, Calif., and had established a revised policy for supplemental compensation at these test facilities. This policy was set out in a letter sent by the respective military services to each of the contractors with employees assigned to Cape Canaveral and Edwards Air Force Base. In substance, this letter urged the contractors to discontinue payment of supplemental compensation at the earliest possible time and stated that reimbursement would not be allowed in any event after June 30, 1960. The letter also pointed out that supplemental pay would not be recognized under new contracts, including supplements to existing contracts, entered into after the date of the letter.

We have also been informed that the Air Force has made further studies at Holloman Air Force Base, a test center which also has problems with respect to supplemental allowances to contractor employees. Based on these studies, the Air Force recommended to OSD that payments of such allowances be discontinued. As of April 30, 1960, OSD was considering this recommendation.

The Armed Services Procurement Regulation Committee, OSD, is considering a revision to the ASPR which will provide policies and procedures to be used in the evaluation of costs of supplemental allowances in cost-reimbursement-type contracts or of costs recognized in pricing fixed-price-type contracts. This revision, if approved, will permit such costs only to the extent that the isolation or unfavorable environment of the site make such payments necessary if the contract work is to be accomplished without acceptable delays.

Scope of Review

In accordance with the request of the subcommittee, our review was conducted in the course of our study of the administrative management of the Air Force ballistic missile program, the scope of which is discussed in detail on page 123 of our initial report to the Congress, released today.

Because of the subcommittee's request, we also developed, insofar as possible, certain additional information, such as the personal gains made by key employees of Ramo-Wooldridge Corp. and Space Technology Laboratories, Inc.; contracts held by Thompson Products, Inc., to supply missile components for the Defense Department; and supplemental allowances paid to contractor employees at Department of Defense test facilities.

FOLLOWUP

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MANPOWER UTILIZATION OF THE
COMMITTEE ON POST OFFICE AND CIVIL SERVICE,
June 7, 1960.

Hon. THOMAS S. GATES, Jr.,
Secretary of Defense,
Washington, D.C.

DEAR MR. SECRETARY: There are transmitted herewith for your information and consideration a copy of this subcommittee's preliminary report on the aspects of the missile program, dated April 1959, a copy of the Comptroller General's report to the Congress on "Review of Administrative Management of the Ballistic Missile Program, May 1960," and a copy of the Comptroller General's report to this subcommittee covering "Survey of Aspects of the Ballistic Missile Program, May 1960," all relating directly or primarily to the Department of the Air Force.

These reports raise many questions which affect both the security and well-being of our country, and are of such a serious nature that I believe you will want to give us the benefit of your views. Accordingly, I would appreciate your comments on the following:

1. The reports indicate that, because of the lack of an in-house capability the use of a contractor was an emergency measure in the initial stages of the missile program. However, since the Air Force now has had several years' experience, the question naturally arises as to why the in-house capability has not yet been developed. This is especially disturbing in view of the number of military personnel who have been associated with, but rotated out of, the program and, consequently, the experience gained by them has not been effectively utilized. In this connection, our inquiries of approximately 2 years ago disclosed that of all the military officers then working on the program at the contractor's plant, not one has been with it from its inception. The foregoing leads to the question, What has been done to develop in-house capability?

2. This failure to develop in-house capability is also disturbing when one considers the fact that the House Committee on Post Office and Civil Service has gone along each time with the Department's requests for additional scientists, engineers, and other supergrades. In view thereof, we are wondering why these career professional employees have not been used to develop such capability in the missile program.

3. The General Accounting Office report shows that a retired lieutenant general has played a large role in the contractor's organization. The questions arise as to whether his abilities in this line were recognized while in the service and how they were used. Secondly, why wasn't he recalled to active duty to assist in the development of in-house capability?

4. Another important question is, Where will the Government stand if the contractor decides to pull out of the program and embark upon other fields? This is not an impossibility. In fact, according to the General Accounting Office report, many of the key personnel in the original Ramo-Wooldridge organization at the time of the reorganization left the program and went with Thompson-Ramo-Wooldridge, Inc.

5. Is this contract inflationary? Does it permit, possibly encourage, the payment of salaries far in excess of what the Government can pay? Is it true that the contractor has recruited a number of Government employees at substantial salary increases? The General Accounting Office report shows Ramo-Wooldridge salaries to be above the national average in comparable fields. In view thereof, we would be interested in learning of the reasons for the Departments' failure to keep these costs down.

6. What about excessive profits? The General Accounting Office report shows the $6,750 investment made by Drs. Ramo and Wooldridge to be worth $2,910,000 and $2,702,100, respectively, at November 3, 1958, New York Stock Exchange

prices. And what was the investment of Gen. H. L. George, whose stock is worth $2,286,400, to say nothing of the others whose holdings, in 1958, were worth from $291,000 to $831,400? Does the foregoing mean, aside from the normal increase in stock values over the past few years, that profits under the contracts were unconscionable? Is this not also inflationary?

7. How do patents developed under this contract affect profits of the contractor? Based on the $95,000 valuation that appears to have been placed on two patents developed under a National Aeronautics and Space Administration contract, it would appear that those developed under the Air Force contracts may have a very considerable value. To what extent, if any, were these considered in fixing the Ramo-Wooldridge fees?

8. In view of the many items brought out in the General Accounting Office report covering rents and acquisition of property and equipment, it would appear that the Department's audit of expenditures under the contract may not have been as effective as it should have been. Are corrective measures in this area being considered?

9. What about the multiapproach and parallelism in the missile program, as originally disclosed by the preliminary report of this subcommittee? To what degree has the administration of the Air Force program by this contractor brought about coordination of technical information and elimination of duplication between contractors?

10. Our report last year also pointed out that the defense efforts of Government and of industry were not fully utilizing our scientific and engineering manpower in the missile program, and also the competition between Government subsidized contractors and the Government involved in obtaining qualified employees. To be sure, there are many issues involved, but we would like to know what progress has been made.

It is recognized that the foregoing questions involve many problem areas. However, in consideration of the fact that we are engaged in a momentous struggle both for our existence and our financial solvency, I urge that these matters be given your personal attention. These problems are of such magnitude that I feel you will want to answer the several questions as your staff develops the necessary information rather than delay the reply until all items are completed.

I would like to express my appreciation for your cooperation.

Sincerely yours,

JAMES C. DAVIS, *Chairman.*

Enclosures:

Preliminary report on the aspects of the missile program in the Departments of the Navy and the Air Force, Subcommittee on Manpower Utilization of the Committee on Post Office and Civil Service, 86th Congress, 1st session, April 1959.

Report to the Congress of the United States—initial report on review of administrative management of the ballistic missile program of the Department of the Air Force by the Comptroller General of the United States, May 1960.

Report to the Subcommittee on Manpower Utilization, Committee on Post Office and Civil Service, House of Representatives—survey of certain aspects of the ballistic missile program of the Department of the Air Force by the Comptroller General of the United States, May 1960.

JULY 15, 1960.

Hon. THOMAS S. GATES, Jr.,
Secretary of Defense,
Washington, D.C.

MY DEAR MR. SECRETARY: This is in reference to my letter of June 7, 1960, to you concerning further inquiry into the Air Force's plans for managing and directing its missile program.

As you are well aware, the Comptroller General in his report to the Congress of May 19, 1960, on the administrative management of the ballistic missile program in the Air Force stated that a program of such importance and a function which so significantly affects a major segment of industry should more appropriately be performed by the Government rather than by a contractor, particularly when the program is continuing in nature.

Our subcommittee has also been concerned with the failure of the Air Force to develop its own capabilities to manage the missile programs.

It has been brought to the attention of this subcommittee that the Air Force is planning to use a nonprofit contractor, Aerospace Corp., to supplement or eventually replace the Space Technology Laboratories in providing technical direction and systems engineering for several missile-space projects.

In consideration of this recent development we would like to have an expression of your views on the following points:

1. In Department of Defense press release of June 29, 1960, the Under Secretary of the Air Force, Hon. Joseph V. Charyk, in speaking of the Aerospace Corp., is quoted, "The new corporation should be regarded as an undertaking which has been designed for permanence and stability. * * *"

What are some of the differences surrounding this undertaking as compared to the relatively short tenure of its predecessors, Ramo-Wooldridge and Space Technology Laboratories?

2. What factors were considered prior to deciding that a nonprofit organization would be more advisable than the development of in-house capability to provide systems engineering and technical direction for the Air Force missile program?

3. What is the anticipated size, personnelwise, of Aerospace Corp. by July 1961? July 1962?

(*a*) If key employees of Aerospace Corp. are to be recruited from Space Technology Laboratories what will be the effect on the programs under the direction of Space Technology Laboratories?

(*b*) Will promising civilian engineers and scientists in the Federal Government, especially Air Force, be given opportunities for advancement to the Aerospace Corp.?

(*c*) Specify the control, if any, that Air Force proposes to exercise over the salaries to be paid by Aerospace Corp.

4. What are the financial arranagements in the contract with the Aerospace Corp.?

(*a*) What is the total capital available to Aerospace Corp.?

(*b*) Who is providing the capital?

(*c*) Are there any contractual provisions relating to the payment of fees by the Air Force to Aerospace Corp.?

(*d*) What is the contractual relationship between Aerospace Corp. and Air Force as to real property and equipment?

5. Will this nonprofit organization take title to patentable disclosures developed under the contract?

We will appreciate your replies to these questions and a summation of any other data that may assist us in obtaining a better understanding of the merits of the Air Force contract with the Aerospace Corp.

Thank you for your continued cooperation.

Sincerely yours,

JAMES C. DAVIS, *Chairman.*

DEPARTMENT OF THE AIR FORCE,
Washington, August 18, 1960.

HON. JAMES C. DAVIS,
Chairman, Subcommittee on Manpower Utilization,
Committee on Post Office and Civil Service,
House of Representatives.

DEAR MR. CHAIRMAN: The Secretary of Defense has asked that I reply, on his behalf, to the matters presented in your letters of June 7 and July 15, 1960, on the management of the Air Force ballistic missile program.

You emphasize that the development of "in-house" scientific and technical capability is essential to this most vital program. I share your concern that our finest talent be concentrated on the challenges of the space age. It does not follow, however, that all of such competence must be mobilized within agencies of the Government—that these scientists and engineers must uniformly become employees of the United States.

Our experience has been that private industry can provide, in an efficient and effective manner, the scientific and technical manpower required for the successful prosecution of the ballistic missile program. A striking illustration in this regard is the Atlas, which was brought to operational status during 1959 within 2 months of the date originally scheduled by the Air Force some 5 years earlier, and from 1 to 3 years ahead of the date generally believed possible

by independent experts when the program was undertaken. Similarly, in the case of the Thor, it is notable that just 3 years after program initiation, an operational missile was fired on target by a SAC crew at Vandenberg Air Force Base; and that during the following year, 1959, three complete Thor squadrons were turned over to the Royal Air Force. For both Atlas and Thor, I might add, missile performance has been obtained which significantly exceeds early design estimates, not only as to range, but also as to reaction time and accuracy.

That the Air Force/industry team has consistently continued to equal and exceed optimistic expectations, and, in what can fairly be described as record time, has provided this Nation with operational strategic ballistic missiles, is clear tribute to our management concept. Equally important, in the long run, is the vast industrial base created by free enterprise, with Air Force guidance, which furnishes a solid foundation upon which to build for the opportunities of the future. These outstanding achievements, which I confidently regard as only a beginning, confirm our traditional reliance upon the strong and growing resources of industry for scientific and technical support of major weapon systems.

At all times, of course, overall program management and direction remain the clear responsibility of, and are firmly exercised by, the Air Force. You may not know that for this purpose we have assembled within the Air Force a high level of "in-house" scientific and technical capability. There are, for example, over 400 Air Force R&D officers at the Ballistic Missile Division; almost half of these men hold advanced degrees and are specialists in fields such as physics, electronics, and engineering. Also of significance in this connection is the enclosed breakdown, prepared in 1959, of the scientific and technical resources available throughout the Air Research and Development Command. We have, to be sure, encountered certain factors, monetary and otherwise, which tend to deter trained personnel from entering Government service. Nevertheless, when the extent of our needs is considered, and it is understood that they fall short of those implied under a total "in-house" approach, it is apparent that we have gone far toward fulfilling these needs.

Air Force program control has also been buttressed by the unique method of management conceived for the ballistic missile program—as explained in detail in the enclosed statement by the Secretary of the Air Force on February 4, 1959, to the Subcommittee on Military Operations, House Committee on Government Operations. Rather than assign systems engineering and technical direction to a single prime weapon system contractor, as had formerly been our general practice, these key functions were vested in a separate organization—Ramo-Wooldridge Space Technology Laboratories (R–W/STL)—which was not permitted to engage in related manufacturing activities. In this manner, it became feasible for the Air Force to contract directly for airframe, propulsion, guidance, etc.; and the Air Force was provided independent, objective, and highly qualified technical review of these associate contractors.

It is true, as you point out, that, short of drastic measures resorted to in a free society only under the direst of circumstances, there is no certain means whereby to assure that any private contractor will continue to be available to perform functions assigned to it by the Government. But surely this factor, taken alone, does not justify placing such functions in the Government, particularly those which have historically been performed by industry.

This is not to say that our system of management has been entirely free from problems; there is, to my knowledge, no system which can be so described. Through a process of continuous scrutiny, beginning with the inception of the program in 1954, we have been aware that there were aspects of our relationship with R–W/STL, primarily arising from its potentially competitive position, which were legitimate cause for concern. Needless to say, through measures such as the "hardware ban," these matters have been minimized and have not been allowed to impede program progress.

We have also sought other solutions. Of great assistance in this regard have been the comprehensive inquiries conducted by the Congress and a study prepared by a group of leading scientists and industrialists headed by Dr. Clark B. Millikan (copy enclosed). As you know, the plan which we have decided to adopt culminated recently in the establishment of the Aerospace Corp.—a nonprofit organization which will assume many of STL's present functions and, in my judgment, provide a sound pattern for future operations. The details of this plan were outlined at length by the Under Secretary of the Air Force on May 6, 1960, before the Subcommittee on Military Operations, House Committee on Government Operations; and I enclose a copy of his statement for your infor-

mation. I also enclose a compilation of data on the Aerospace Corp. which is responsive to your specific requests.

I can assure you that, in reaching the foregoing decision, we gave careful consideration to a complete "in-house" approach. The advantages of this method were fully appreciated; in our view, however, they did not outweigh the proven ability and accomplishments in this area of private industry. As I have indicated, the Air Force must have employees who are qualified to discharge its responsibilities for overall program supervision. But it is my conviction that the services of organizations such as the Aerospace Corp. are also required if we are to take the course of action which most nearly guarantees the continued success of our ballistic missile and space programs.

You have also asked for comments on certain specific features of the R–W/STL contract, such as profits, salaries, patents, and facilities, in light of reports issued in May 1960, by the General Accounting Office.

In supplement to the material on these items which has previously been aired and made a matter of public record, by your subcommittee, in the enclosed Report on Organization and Management of Missile Programs, House Committee on Government Operations, September 2, 1959 (No. 1121, 86th Cong., 1st sess.), and otherwise, I would emphasize the following: It is my opinion that the fees allowed R–W/STL, which to date approximate less than 10 percent of total contract costs, are commensurate with the magnitude of its functions, competence, and invested capital, to say nothing of other factors such as the severe restrictions imposed upon its participation in associated development and production. It is significant that, for the years 1954 through 1957, the only years for which renegotiation has been completed, the Renegotiation Board, an independent agency of the Government, has determined that the contractor's profits were not excessive. I would also point out that R–W/STL salaries for scientific and technical personnel have been thoroughly examined by the Air Force and found to be appropriate, in view of the above-average education, experience, and abilities of its technical staff, its special form of organization, and its central role in our missile and space programs.

As to R–W/STL patents, the policies followed were the same as those prevailing throughout the Department of Defense and applicable generally to all defense contractors. Concerning R–W/STL facilities, I find that the original decision to minimize the Government's investment through leasing was justified, in view of the urgent and uncertain circumstances existing when the program was initiated. For the future, I believe that the degree of permanence now realized will permit more outright acquisition of property along the lines urged by the GAO. This can be done, of course, without the Government taking over the functions now performed by STL and the Aerospace Corp.

Nor do I read the GAO reports which you cite as being inconsistent with the foregoing conclusions. This is evident in the case of patents and facilities. Similarly, the GAO does not question the reasonableness of the contractor's fees; and it recognizes that there is a broad area of discretion, which it does not hold to have been abused, regarding the contractor's salaries. In fact, while advancing the need for corrective action in a few instances, such as certain leasing of personal property (where, as stated by the GAO, improved procedures had already been implemented), the GAO does not appear to suggest that there have been basic deficiencies in the management of the R–W/STL contract; and the GAO's recommendations for what it asserts to be improvements of the present system are based essentially on other grounds.

Obviously no program, much less the largest defense development effort ever undertaken by this Nation, can be conducted so as to be invulnerable, in every procurement detail, to postaudit. Business-as-usual methods do not comport with a mission of the highest national priority. The remarkable lack of irregularities in the ballistic missile program, as disclosed by the results of the GAO's extensive investigation, is a source of satisfaction to the Air Force.

I have several observations on the remaining points which you discuss. In my judgment, our integrated system of management has set new standards for the dissemination of technical information and avoidance of duplication of effort; in the first 6 months of this year, for example, the Technical Data Division of our Ballistic Missile Division distributed in excess of 165,000 documents. I would also note that Gen. H. L. George, to whom you refer, had rendered 30 years of distinguished military service upon his retirement in 1947; and that, thereafter, his considerable talents in the field of administration were again employed, through the medium of industry, on matters of national importance.

Finally, with reference to military personnel rotated out of the ballistic missile program, it can be stated that, with few exceptions, such personnel were transferred to positions which utilized their special skills and background.

I trust that my remarks, and the enclosures hereto, will supply the information which you desire and our position on the fundamental issues which you have raised.

Sincerely yours,

DUDLEY C. SHARP.

(EDITOR'S NOTE.—Due to bulk the following references by Secretary Sharp have not been included in this report, but the referenced materials are public documents available to the public:

(*a*) Statement of Secretary of Air Force, February 4, 1959, to Subcommittee on Military Operations, House Committee on Government Operations.

(*b*) Report by an Air Force interagency group headed by Dr. Clark B. Millikan to evaluate Air Force ballistic missile and space programs.

(*c*) Statement of Under Secretary of Air Force, May 6, 1960, to Subcommittee on Military Operations, House Committee on Government Operations,

(*d*) Report on Organization and Management of Missile Programs, House Committee on Government Operations, September 2, 1959.)

Air Research and Development Command

PERSONNEL

Military:	
Officers	5,844
Airmen	15,292
Civilian:	
Graded	14,444
Wage board	8,717
Technical officer [1]	3,406
Technical airmen [1]	8,109
Technical civilian [1] (5,000 scientists and engineers)	10,288
Total	44,297

[1] The above includes engineers, scientists, and technicians.

EDUCATIONAL LEVELS OF ALL ARDC OFFICERS

Seventy-five percent have at least a bachelor's degree.
Twenty-five percent have at least a master's degree.
Three percent have a Ph. D. degree.

EDUCATIONAL LEVELS OF TECHNICAL OFFICERS

Ninety-three and five-tenths percent have at least a bachelor's degree.
Thirty-four and five-tenths percent have at least a master's degree.
Two and five-tenths percent have a Ph. D. degree.

CIVILIAN SCIENTISTS AND ENGINEERS (5,000)

Ninety-two percent have at least a bachelor's degree.
Twenty-six percent have advanced degrees.

AEROSPACE CORP. DATA

1. *Personnel.*—It is estimated that Aerospace Corp. will have 2,500 personnel by July 1961; 3,500 by July 1962.

2. *Effect on STL.*—The STL employees proposed for transfer to Aerospace Corp. do not include those engaged in programs which remain assigned to STL.

3. *Effect on Government.*—Subject to compliance with conflict-of-interest statutes and regulations, there is no objection to Government personnel seeking employment with Aerospace Corp. or, for that matter, with any other private organzation.

4. *Salaries.*—Aerospace Corp. salaries will be reviewed by the Air Force for reasonableness in the manner prescribed by existing procurement regulations.

5. *Financial arrangement.*—Air Force contracts with Aerospace Corp. will be on a cost-reimbursement basis.

6. *Capital.*—The Air Force has entered into an advance payment agreement for an authorized amount of $5 million with Aerospace Corp. to finance its present operations.

7. *Fees.*—The amount of the Aerospace Corp. fee is currently under negotiation.

8. *Facilities.*—The Air Force will furnish facilities to Aerospace Corp. under the same terms and conditions generally applicable to defense contractors.

9. *Patents.*—The question of rights in patents developed by Aerospace Corp. is now under negotiation.

APPENDIX

HOUSE OF REPRESENTATIVES,
COMMITTEE ON POST OFFICE AND CIVIL SERVICE,
Washington, D.C., February 10, 1959.

Hon. JOSEPH CAMPBELL,
Comptroller General of the United States,
Washington, D.C.

DEAR GENERAL CAMPBELL: Under authority of House Resolution 139 of the 85th Congress our committee held hearings in December 1958 and one of the areas of interest related to the Defense Department's utilization of scientific and professional manpower in the missile program. The committee staff prepared some background material for the hearings which has been furnished your office along with copies of the hearings. Under authority of House Resolution 78 of the 86th Congress our committee is continuing its inquiry into the manpower and related implications of the missile program.

In the course of the General Accounting Office study of missiles we would appreciate your developing for this committee information relating to several items which are within the area of this committee's responsibility.

We want to know the following about the Air Force long-range ballistic missile program:

(1) What standards have been and/or should be established by the Federal Government to determine the reasonableness and uniformity of fees in cost-plus contracts? For example, our hearings developed a noticeable difference in cost-plus fees as well as salaries paid by various missile contractors. Ramo-Wooldridge Corp. (Now Space Technology Laboratories) was paid an average fee of 11.9 percent with average salary of key employees at $30,732. Applied Physics Laboratory (Johns Hopkins University) was paid an average of 4.6 percent fee and their average salary of key personnel was $15,540.

(2) Why was the Ramo-Wooldridge Corp. placed in such an indispensable position in Air Force's long-range ballistic missile operation?

(3) What has been the financial relationships between Ramo Wooldridge Thompson Products, Inc., and the Space Technology Laboratories?

(4) What personal gains have been made by key employees and former Government employees, military and civilian, in the Ramo-Wooldridge Corp. and Space Technology Laboratories as these corporations have become an integral part of Thompson Products, Inc.?

(5) What is now the operating relationship of the Space Technology Laboratories, Ramo-Wooldridge Corp, and Thompson Products, Inc.?

(6) What contracts did Thompson Products, Inc., have during the past 5 years, either as prime or subcontractor to supply missile components for the Defense Department? Were any of these contracts developed or reviewed by Ramo-Wooldridge Corp. or Space Technology Laboratories?

(7) Were any contracts, prime or subcontractor, awarded the Ramo-Wooldridge Corp. to produce hardware of any type for the Defense Department?

(8) Explain the relationship of the prime contractor for a long-range ballistic missile to the function of the Space Technology Laboratories. What do the STL personnel contribute that does not overlap and duplicate the efforts of the prime contractor or the Air Force staff?

As your office investigates other areas in the missile programs we would appreciate information on the following additional items:

(*a*) Cost-plus contracting procedures have resulted in practices by contractors of spreading costs over several contracts. The committee would like to know the reasons for this practice, approximately the extent to which it is being used, the degree of controls over items of cost, including personnel, and the effect of these practices on renegotiation of the contracts.

(*b*) Our committee noted that the publicly announced policy of the Defense Department, insofar as misisle production is concerned, is one of parallelism and multiple approach. It would appear that with this approach there is reason to suspect unwarranted duplication in missile plans, components, and testing, either within the Federal Government, as between defense contractors and the Federal Government or among defense contractors.

(*c*) Our examination revealed that at one defense activity, Holloman Air Force Base, Alamogordo, N. Mex., employees of cost-plus fee contractors were paid per diem allowances varying from $8 to $15 per day. This action has often proved a negative factor on the morale of Government personnel, without the per diem allowances but working alongside of the contractor's employees. It is also a factor among contractor employees who realize that they are not getting the same consideration under similar circumstances. In raising the question, we feel that this personnel practice may be pertinent to other places, and therefore the overall policy and procedures are of sufficient interest for more complete development.

(*d*) The practice of private businesses, especially those working on Government contracts, of employing retired military officers, seems to be on the increase. For a recently retired officer to merely move from one side of the desk to the other, still dealing with the same subject matter, tends to create a doubtful atmosphere, if not a violation, of the Federal statutes. We are concerned with the responsibility which these retired officers and Defense Departments have to themselves, and to the intent of the Congress, as expressed in several Federal statutes controlling the activities of retired or former officers dealing with the Federal Government.

(*e*) Civilian employees of the Military Establishment are being recruited by the Government-subsidized contractors. The Government, as a result of its procurement policies, is competing with itself. A review of the personnel practices of some of these Government contractors, including recruiting and training expenses, would appear in order. Also, an investigation of the Military Department's procedures to monitor these features in the contracts would be appreciated.

These are some of the items developed by our committee which have been a cause for concern to all the Members. It is the feeling of the committee that the defense of our Nation transcends a unilateral approach to our mutual objective, getting the facts, and making an objective appraisal of the situation. Therefore, we are asking your assistance in this matter. It is possible that your office has already developed information in some of these areas. Consequently, we would like to be advised from time to time as the facts are developed.

We appreciate the fine cooperation of the General Accounting Office and its staff, especially in developing much of this information for the committee hearings. If more specific information concerning the several items raised is needed, our staff will be most willing to discuss it with representatives of your office.

With kindest personal regards, I am

Sincerely yours,

JAMES C. DAVIS,
Chairman, Subcommittee on Manpower Utilization.

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, May 19, 1960.

Hon. JAMES C. DAVIS,
Chairman, Subcommittee on Manpower Utilization,
Committee on Post Office and Civil Service,
House of Representatives.

DEAR MR. CHAIRMAN: Further reference is made to your letters of February 10 and April 27, 1959, requesting the General Accounting Office to obtain certain information in the course of the review of the Air Force ballistic missile program. On October 21, 1959, we forwarded a report covering item (*c*), relating to supplemental payments to contractor employees at Department of Defense test facilities. We are enclosing a report covering items (1) through (8), and (*a*) and (*b*), together with additional information concerning item (*c*). No information is presented with respect to items (*d*) and (*e*), pursuant to discussions with the staff of the subcommittee.

Much of the information contained in this report is similar to that contained in a preliminary draft of our report to the Congress, which was reviewed by the

Air Force and the contractor engaged for the systems engineering and technical direction of the program, Ramo-Wooldridge Corp., now Space Technology Laboratories, Inc., a wholly owned subsidiary of Thompson Ramo Wooldridge, Inc. Therefore, we did not obtain their comments on the special report prepared in response to your request.

To facilitate your review, we are quoting in our report the specific items contained in your request and are summarizing immediately thereafter the information obtained, followed by a detailed discussion. The table of contents identifies the location of each of these items in the report. We are also enclosing a copy of our initial report to the Congress on the review of administrative management of the ballistic missile program of the Department of the Air Force, released today.

We hope that the information furnished will be helpful to the subcommittee in its continuing investigation of manpower problems connected with the ballistic missile program. We will be pleased to discuss our findings with you or your staff if you so desire.

Sincerely yours,

JOSEPH CAMPBELL,
Comptroller General of the United States.

○